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31 October 1979

# Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 16



FOREIGN BROADCAST INFORMATION SERVICE

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31 October 1979

# WORLDWIDE REPORT

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No. 16

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# SWEDEN'S DECISION ON NUCLEAR ENERGY MAY AFFECT AUSTRALIA

Sydney THE SYDNEY MORNING HERALD in English 12 Sep 79 p 1

[Text] The future use of nuclear power is a major subject of controversy in Sweden. Next year the nation will vote in a referendum to decide whether to continue production or switch to an alternative fuel. Either way, Australia could benefit. Ian Frykberg, who recently visited Stockholm, reports.

AUSTRALIA is more than an interested observer of the outcome of the major debate on the role of nuclear energy in Sweden. In cynical terms, we can't lose whichever way it goes.

The nuclear question is the dominating factor in Swedish politics, and next March the country will decide by referendum whether it should continue and expand nuclear plants or phase them out.

The precise wording of the referendum question has yet to be agreed to, and will depend to an extent on who wins Sunday's important general election.

Opponents of nuclear energy want the country to vote "yes" or "no." But the Prime Minister for the past year, Mr Ola Ullsten, would prefer to see the country vote for the proposed six new reactors, or to phase out the existing six reactors over a number of years.

Whatever happens, Australia is sitting lucratively on a fence.

If the country decides to stay with, and expand, nuclear energy then Australia's uranium is almost certain to be one of the sources, domestic circumstances in Australia permitting.

If the answer is no, or even if it is for a phasing out, then Australia's low-sulphur steaming coal will be in demand as a possible alternative energy source.

"If nuclear is out then we will certainly be looking at Australian coal, because it has a low-sulphur content and will be more acceptable," a spokesman for the Confederation of Swedish Industries said.

The situation has not been lost on Australian industry: a Government-backed mission will arrive in Sweden later this month as part of a month-long investigation of export possibilities in Scandinavia.

But all this is conjecture. In the meantime the Swedish electorate and its political parties will have to try to sort out a question that is in the forefront of the country's life.

Sweden has always prided itself as being a bit ahead of the rest of the world with its welfare State, political stability, industry technology, and development of nuclear energy.

## States

So much so, that the very considerable debate and problems notwithstanding, Sweden now produces 25 per cent of its electricity from its six existing nuclear reactors.

If it decides to go ahead with the six new reactors (they are in various stages of completion pending the referendum), then nuclear power will produce 45 per cent of Sweden's electricity needs by 1985.

At the heart of the debate now going on in the country is the realisation that if Sweden is to continue its very high standard of living, its very comprehensive but costly welfare State, and its industrial strength, it will have to quickly cut its dependence on oil.

Oil accounts for 70 per cent of the country's energy supply.



Sweden's import bill for oil and uranium is about \$3.2 billion annually.

It has no coal or oil deposits. It does have a known 300,000 tonnes of uranium, but it is low-grade, would be difficult to mine and would involve another environmental controversy the country can do without.

So the problems of energy are never far from the politicians' minds, and the average Swede is far more educated about the energy situation, and the need to conserve it, than, say, the average Australian.

The proponents of nuclear energy as the most economic form of energy — led by the Confederation of Swedish Industries — say that it is essential for the continued economic prosperity of the country for the program to be maintained and expanded.

They say that satisfactory means of disposing of waste, mainly through entombing it, have been perfected and that it would be drastic if nuclear power was rejected.

The opponents say there are still too many questions about the safety and proliferation aspects of nuclear energy, and contend that belt-tightening, a return to a simpler way of

life, and alternative energy sources are the answer.

Certainly the costs of abandoning the nuclear program would be high for Swedes.

"We could certainly survive without nuclear energy, but it would be at a fearful cost, and the Swedish social system is bound to be affected," the Prime Minister, Mr Ullsten — a supporter of the six new reactors program — said recently.

It is no surprise, then, that the Harrisburg accident had a more profound effect in Sweden than it did in the United States. It changed Swedish politics.

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## Support

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The country's largest political party, the Social Democrats, which has governed for 44 years until 1976, suddenly altered its stance. It had been firmly in favour of the 12-reactor program. Now it advocates the referendum.

Before Harrisburg, only the Centre Party and the Communist Party had been calling for a referendum. After Harrisburg there was no political alternative for the major parties but to support it.

The Centre Party, which has

been the most vocal of the anti-nuclear lobby, maintains that the reactors could be phased out over 10 years and replaced by more hydro-electric and coal stations, solar energy, peat-burning, and wood-waste burning.

But this is, of course, not as easy as it seems on paper. There are major environmental problems with coal stations and much research into the disposal of their waste would be demanded. Sweden receives about 70 per cent less sunshine than North Africa, and very little in the long winter months. The environmentalists are against more hydro-electric power stations.

Another alternative under active study at the moment is the burning of waste from one of the country's major industries, the pulp and paper industry.

All in all, the Swedes are approaching the problem of finding alternatives to oil with an urgency and fervour that the Arab States would find distinctly uncomfortable if repeated in other major economies.

The latest polls show that support for and against nuclear energy is running about even, with about 20 per cent of the people undecided.

## BRITISH, JAPANESE EYE SHARES IN AUSTRALIAN URANIUM MINE

### Japanese in Canberra

Sydney THE SYDNEY MORNING HERALD in English 6 Sep 79 p 8

[Article by Russell Barton]

[Text]

CANBERRA. — Representatives of three Japanese companies met Department of Trade and Resources officers yesterday to discuss buying the Federal Government's share in the Ranger uranium deposit.

The delegation of six will meet the Minister for Trade and Resources, Mr Anthony, on Monday.

They are from the Kansai Electric Power Co, the Kyushu Electric Co and the trading giant, C. Itoh.

Government officials said the delegation sought background on the Government's agreement with the original Ranger partners, EZ Industries and Peko-Wallend.

The agreement requires the Australian Atomic Energy Commission to provide 72½ per cent of capital development costs for the mine in return for the Commonwealth's half share of the uranium production.

The AAEC has already put up just over \$17 million in

development costs, but the 1979 Budget papers show that \$80 million has been provided for this financial year.

Overall, the AAEC will need more than \$240 million of Government money to meet the costs of the agreement.

Any buyer of the Government's share of Ranger will have to continue with the agreement.

The Government has already received more than 40 "expressions of interest" for the share. It has set September 30 as the deadline for all offers.

The original partners, EZ and Peko, have criticised the Government's action in putting the Ranger stake on the open market. They are now involved in negotiations aimed at forming a predominantly Australian consortium to take over the stake.

The Japanese companies are interested in buying the half-share to give them security of uranium supply for their power-generating stations.

UK Electricity Board

Melbourne THE AGE in English 12 Sep 79 p 1

[Text]

LONDON, Sept. 11. — Britain's Central Electricity Generating Board has told Canberra it is interested in buying the Federal Government's 50 per cent stake in the Northern Territory's Ranger Uranium project.

A CEGB spokesman today noted that the Australian Government has called for firm proposals by the end of the month. He said the board needed more data before making a formal bid.

Industry sources said the board, which recently teamed up to form the Civil Uranium Procurement Directorate with British Nuclear Fuels and the South of Scotland Electricity Board, is still developing its nuclear fuel supply policy.

CSO: 5100

## GOVERNMENT RELAXES CONTROLS ON URANIUM INDUSTRY

Kuala Lumpur BUSINESS TIMES in English 20 Aug 79 p 5

[Article by Andrew Clark in Sydney]

[Text] AMERICAN companies are the greatest potential beneficiaries of a significant relaxation of the restrictions on foreign investment in exploiting Australia's rich uranium deposits.

The loosening of local equity requirements from 75 per cent to 50 per cent under "special circumstances," and other steps taken earlier this year, reflect the Australian government's determination to export uranium as soon as possible.

The recent decision was announced at the same time the government approved the development of the Yellirrie uranium deposit in Western Australia, the third such development approved this year. Yellirrie — 75 per cent of which is owned by Western Mining, a local company, 15 per cent by Esso, the overseas arm of Exxon, and 10 per cent by Angewandte, a West German company — contains 65,000 metric tons of ore. A metric ton is about 2,200 pounds.

The agreement included a price-sharing arrangement under which Esso would provide an additional 30 per cent of the project cost and would be entitled to an additional 30 per cent of the product. In a statement last month, Mr

John Howard, Australia's Treasurer, said the Australian Foreign Investment Review Board had decided this arrangement breached the strict 75 per cent rule.

Under the new guidelines, however, a uranium project may be permitted if four conditions are met: It has been impossible to achieve 75 per cent Australian interest, the project would be of "significant economic benefit," there would be at least 50 per cent local participation and the Australian partners would retain the major voice in determining policy.

Mr Howard did not specifically mention Jabiru, the world's largest uranium project, situated in Australia's remote Northern Territory. But his announcement has raised hopes among the partners in the joint venture that their current proposals, which breached the earlier rules, will now be accepted.

Under longstanding arrangements, Pancontinental, a local company, has 60 per cent of the 207,000-ton mine, and Getty Oil, of the United States, 20 per cent. Getty will provide an unconditional guarantee for Pancontinental's effort to raise the estimated US\$250 million to develop

the mine and build a milling plant.

The government has now introduced an element of flexibility into its policies which wasn't there before," Mr Tony Green, the chairman of Pancontinental, said in an interview. But he would not say whether he thought the project would proceed.

So far this year, approval has been given for Yellirrie Ranger, a mine with at least 104,000 metric tons of uranium, and Nabarlek, with about 10,000. Like Jabiru, all are in the East Alligator River region, where the bulk of Australia's uranium has work started on both the Ranger and Nabarlek sites when the northern wet season ended in April.

The government further loosened its control over the local uranium industry this month by deciding to sell its 50 per cent stake in the Ranger deposit.

The decision was immediately condemned by the opposition Labour Party, and the other partners in the project, Fohs-Wallend Ltd. and its industries, both Australian companies. A spokesman for the companies says they will seek to arrange for an Australian consortium of "mining and financial interests" to buy the government share.



ABORIGINES CONCERNED OVER EXPOSURE TO NABARLEK URANIUM

Canberra THE WEEKEND AUSTRALIAN in English 8-9 Sep 79 p 15

[Article by Matt Handbury]

[Text]

**A** LEAKED telex message has raised again the vexed issue of Aborigines being exposed to radiation at the Nabarlek uranium mine in Arnhem Land.

The Mines Department telex expresses concern over the proximity of an Aboriginal camp to stored uranium ore on the site.

A discarded pile of sample bags is also mentioned, allegedly having radiation levels 85 times the accepted safe level.

The exact standing of uranium in the traditional relationship between the Aborigine and Koonapippi — the Earth Mother — is not clear.

Old-time Queensland Mines Ltd employees talk of how they found Aboriginal children playing with exposed radioactive material when they first arrived at the site 10 or 20 years ago.

But Aboriginal Liaison Officer, Solomon Nayilbitj, is now more than anxious to have his health checked, after being told of the evils an open tank of ore might have brought upon his family when they were camped nearby. The company is adamant no one is at risk.

If Solomon came and asked for a check he'd be cleared completely — unless he's been eating it for breakfast, a company officer said.

"And if we'd found off-the-scale samples six kilometres away we'd have pegged that area out and developed it too."

Labour MLA for Arnhem, Bob Collins, agrees Nayilbitj would show no signs of damaged health.

"The effects of exposure would not show for 10-20 years," he said.

"This is just another example of the utter contempt with which mining companies treat the land and people who live on and with it."

In the middle of the row once again is the Northern Land Council, set up under

the Aboriginal Land Rights Act, NT (1978) to represent the traditional owners of the area.

The telex was leaked by a young white employee of the NLC and has embarrassed its executive, which has now called on QML to remove any discarded samples.

But, as the company officer pointed out, QML has not had area access since 1973.

The NLC was recently criticised by traditional owners for not seeking their approval for QML to use the only access road to the site.

This alleged collusion between the NLC and the mining company came to a head this week with the serving of a writ seeking an order to close the road.

This leaves the company with an unsealed airstrip to move out 8000 tonnes of U308.

Territory Health Minister, Ian Tuxworth, seems to have been left a step behind in the action regarding the disputed radiation levels at Nabarlek.

## AUSTRALIA

### TRADE UNIONS CONGRESS CONSIDERS URANIUM POLICY

#### Draft Uranium Policy Reported

Melbourne THE AGE in English 7 Sep 79 p 1

[Article by Michael Gordon, chief industrial reporter]

[Text] The ACTU executive has recommended a change of uranium policy to approve mining at the Ranger and Nabarlek sites.

The executive will ask next week's ACTU Congress to accept mining at Ranger and Nabarlek as a "reality".

The decision of the executive flies in the face of ALP policy and will cause deep divisions within the ACTU.

It will also widen the rift between the ACTU president, Mr. Hawke, and the Left Wing of the ALP.

The senior vice-president of the ACTU, Mr. Cliff Dolan, strongly opposed the decision and will ask the congress to support the withdrawal of labor from all uranium mines.

Mr. Dolan and Mr. Hawke are believed to have clashed when the policy was presented to the ACTU executive in Melbourne two weeks ago.

Mr. Hawke supported the new draft policy, which was prepared by ACTU officers after talks with Governments, unions, aboriginal groups, companies and overseas interests.

The draft policy seeks a moratorium on development beyond the Ranger and Nabarlek mines in the Northern Territory.

The moratorium would be reviewed at the next ACTU Congress, in Sydney in 1981.

### Repudiation

Existing ALP policy supports a complete moratorium on mining and pro-

cessing and the repudiation of contracts entered into by non-Labor governments.

The policy adopted at the last ACTU Congress recommended that labor not be made available for the opening or operation of new mines. This covered Nabarlek and Ranger.

The ACTU executive is believed to have voted 12-5 in favor of the draft policy.

Mr. Dolan is believed to have unsuccessfully put an amendment which sought withdrawal of labor from all uranium projects.

The draft policy says the ACTU believes mining will take place at Ranger and continue at Nabarlek and Mary Kathleen because "workers will be available to construct sites, provide associated services and mine and export uranium".

The draft concludes that the nuclear waste problem has not been solved, but says developments in Sweden, France and the possible development of Synroc "offer promise".

The three-page draft says: "Although the preferred position by the majority of unions would be in favor of not mining & export uranium, reality de-

mands that we come to terms with the fact that mining will continue at Ranger and Nabarlek.

The Federal secretary of the Miscellaneous Workers' Union, Mr. R. Gietzelt, moved the draft policy at the executive meeting.

Labor Party spokesmen were not available for comment last night, but conservation groups said the executive had skirted around the uranium issue.

## Rally

The Movement Against Uranium Mining has planned a rally at the ACTU Congress at Dallas Brooks Hall on Monday at 4.30 pm.

The movement's Victorian convenor, Mr. John Speight, said last night: "We don't want to tell the unions what to

do. What we are saying is that we're prepared to stand shoulder to shoulder with the trade unions opposed to the mining and export of uranium."

Earlier this year, a meeting of 12 uranium unions decided to take no action against two unions which were in breach of existing ACTU policy.

The draft uranium policy says it is vital that:

- The health, safety and working conditions of uranium workers be protected by proper regulation and control.
- Safeguards covering the supply of uranium be strengthened to prevent Australian uranium being used for other than peaceful purposes.
- The union movement express its opposition to any further development beyond that of Ranger and Nabarlek.
- Further research be undertaken on non-nuclear options and the safe disposal of nuclear wastes.

### Draft Termed 'Common Sense'

Canberra THE WEEKEND AUSTRALIAN in English 8-9 Sep 79 p 14

[Editorial: "Uranium Mining Must Go Ahead"]

[Text]

THE 18-member ACTU executive has shown plain common sense in recommending that the ban on uranium mining be lifted for two major Northern Territory projects - Ranger and Nabarlek. Its "thumbs up" decision on the controversial question will be put in the form of a draft recommendation to the biennial ACTU Congress in Melbourne next week. The executive is taking a pragmatic approach. It has to, bearing in mind that at least three ACTU-affiliated unions are presently seeking awards to cover their members' involvement in uranium development and mining. It is to be hoped that member-union delegates see things in the same light as the executive at the congress next week, and throw out the 1977 congress veto on new uranium mining developments.

The uranium mining issue is not a simple one, and no one can realistically suggest that it is. The mere fact that the ACTU executive wants to

allow uninhibited mining at the two areas, apparently by 14 votes to 4, also does not suggest that they are in favor of mining by better than a three-to-one majority. It suggests only that some 14 members faced reality; four did not. A sentence in the draft recommendation succinctly sums up the issue: "Although the preferred position by the majority of unions would be in favor of not mining and exporting uranium, reality demands that we come to terms with the fact that mining will continue at Ranger and Nabarlek."

The question of whether or not to mine uranium has foamed and bubbled for the best part of five years, although realists in the union movement have come to accept the inevitable. But until now the ACTU has been far from creating a coherent uranium policy. Its dilemma was heightened after a series of State ACTU meetings around the nation in February, 1978, succeeded only in emphasising the

degree to which the union movement is split on the issue. The executive's recommendation to next week's congress hopefully can settle the argument once and for all.

The ACTU executive's sensible stand may well prove to be an embarrassment to the A.L.P., whose policy still insists that mining may progress only until existing contracts are honored. But it is the A.L.P. which is out of step. Not the ACTU executive. Already the South Australian Labor Government is showing signs of softening its approach to the uranium issue, having recently given Western Mining Corporation and British Petroleum the green light for accelerated exploration of the Roxby Downs uranium, copper and gold prospect which will be a fizzer unless uranium extraction is allowed. South Australia needs major developments of the Roxby Downs calibre; just as Australia needs developments of the Ranger and

Nabarlek ilk - plus some. And before long the A.L.P. will have to appreciate this.

So long as the most stringent safeguards are enforced, nuclear power has been found to be the only viable energy-generating alternative to coal and oil so far. The nuclear power industry will be developed whether or not Australia contributes uranium, albeit at a higher cost because of the concentrated demand which would be focused on alternative sources of uranium. It is an inescapable fact that the world needs energy, and we have the raw materials in abundance for production of this energy. But it is not all one-way traffic. Australia needs the jobs and the money. It makes plain common sense to allow uninhibited development and exploitation of the Ranger and Nabarlek deposits. As for other major uranium developments? We will eventually have to accept their inevitability also.

#### Unions Black Nuclear Power

Melbourne THE AGE in English 12 Sep 79 p 1

[Article by Michael Doyle]

[Text]

The ACTU has black-banned the use of nuclear power in Australia.

The ACTU congress yesterday reaffirmed that nuclear power was an unnecessary form of energy for Australia.

The decision comes on the eve of debate on the ACTU executive's recommendation that opposition to uranium mining at the Ranger and Nabarlek sites be removed.

The black ban would thwart the West Australian Government's plan to have a nuclear power plant operating by 1985.

The secretary of the WA Trades and Labor Council, Mr. Peter Cook, denied that yesterday's decision conflicted in any way with the executive's recommendation on mining.

It was certainly a direct ban on the building of nuclear power plants but it could not be construed as a ban on mining, he said.

"There is no moral dilemma. The decision is consistent for supporters of mining and for opponents of nuclear power generation.

"If other people overseas want to generate nuclear power, that's their choice, and we can still supply them with uranium if the executive recommendation gets through."

Mr. Cook, a member of the executive, moved yesterday's motion on energy resources, which called for:

- A resources tax on domestic oil reserves.

- More direct Government involvement in oil refining, exploitation and marketing.



• Increased controls over energy-producing multinational companies.

Mr. Cook said he would make his stance on uranium mining clear when the recommendation debated tomorrow.

## Rejection

The ACTU senior vice-president, Mr. Cliff Dolan, is expected to move tomorrow for total rejection of the support for all uranium mining.

Left-wing unions have had several meetings this week to organize opposition to the recommendation.

Some Left-wing delegates to the congress believe the executive will be forced to modify its stance.

If the recommendation is passed it will signal a split between the ACTU and the Labor Party over uranium policy. ALP policy is for a ban on all new mining.

The recommendation opposes any mining apart from Ranger and Nabarlek but allows for a review of the moratorium at the 1981 congress.

AUSTRALIA

BUILDING OF URANIUM ENRICHMENT PLANT UNDER CONSIDERATION

Prime Minister's Remarks

Melbourne THE AGE in English 7 Sep 79 p 1

[Text]

CANBERRA. — The Prime Minister, Mr. Fraser, yesterday strongly advocated the building of a uranium enrichment plant in Australia.

"It's something I believe will come. It's something I believe ought to come," Mr. Fraser said in Townsville.

The Federal Government has approached several large companies recently asking them to study the commercial prospects of an enrichment plant.

The study would also examine what technology such a plant — which on present estimates would probably cost more than \$1000 million should adopt.

Federal officials spoke to the companies several weeks ago and formal replies are expected within a month. State Governments have also been approached.

Mr. Fraser said yesterday at least two States, Queensland and Western Australia, "would dearly love to have the enrichment plant".

Officials estimate the preliminary study now being discussed would probably take 18 months and a later more detailed study would take as long again.

Mr. Fraser ruled out a Government-owned plant.

"We wouldn't just want to build a Government operation with taxpayers' dollars being spent on development.

"It's something that private industry ought to be involved in.

"But obviously anything to do with uranium has got to be under the strictest safeguards and controls."

## Firms, Governments Approached

Melbourne THE AGE in English 8 Sep 79 p 31

[Article by Michelle Grattan in Canberra]

[Text]

Several large companies are likely to launch a study of the commercial viability of a uranium enrichment plant in Australia.

The Federal Government recently approached four companies — BHP, CSR, Western Mining and Peko-Wallsend.

A spokesman for BHP said yesterday the company had agreed in principle to take part.

"We understand the other companies have done likewise," he said.

"We'll be meeting in the near future to formulate a plan on how it will be carried out."

Western Mining's chairman, Sir Arvi Parbo, confirmed his company was interested in participating.

But neither CSR nor Peko-Wallsend would comment.

The Atomic Energy Commission would be available

to supply technical assistance for a study.

According to Government sources, the companies haven't formally notified the Federal Government of their response to its approach.

The Government chose these companies partly because they had been associated with a group which had already discussed the possibility of a local enrichment industry.

The Government has also approached France, the United States and Japan about supplying information for a viability study.

France has signalled agreement and indications are that the US and Japan would be prepared to participate.

Already the Urenco-Centec organisation, a joint British, West German and Dutch group which has built several small enrichment plants, has expressed interest in its technology being used in Australia.

CS0: 5100

# PROBLEMS OF MARKETING URANIUM OXIDE EXAMINED

Melbourne THE AGE in English 10 Sep 79 p 14

["Comment" by Kenneth Davidson: "Time for a New Look at Uranium"]

[Text]

UNION opposition to uranium mining has been effectively removed as a result of the ACTU executive's recommendation to the congress this week that the reality of mining should be accepted.

This clears the way for examination of the real problem, which is: Can Australia profitably sell uranium oxide on world markets and still maintain the safeguards already laid down by the Fraser Government?

Despite the controversy over uranium, the fact is that Australia has not signed a sales contract with an overseas power utility since the end of 1972. The consensus in the community appears to be that once the green light for exports is given, Australia will enjoy a bonanza.

This may be so in the long term but it will require a major upgrading of the nuclear power programmes of Western Europe, America and Japan. Even if this occurred in the very near future, it would not be reflected in additional demand for uranium to fuel these plants until the early 1980s.

With the exception of Britain, nuclear power programmes in the major consuming countries are either being cut back or are bogged down.

Present nuclear power generation forecasts suggest it is not likely that either Western Europe or Japan will need additional uranium contracts for delivery before the early 1980s.

But there has been an upsurge in uranium exploration around the world and known world reserves have been expanded, particularly in underdeveloped countries.

According to evidence given to the Fox Commission by the Atomic Energy Commission, planned world production of uranium oxide would be about 80,000 to 100,000 short tons a year by 1985.

Against this, extrapolating from in-of nuclear power generation, it would international energy agency forecasts appear that annual demand for uranium oxide would be about 50,000 short tons by 1985, increasing to around 80,000 short tons in 1995.

On the production side, potential Australian output of about 10,000 short tons a year can be added if markets can be found.

Since the atomic energy forecast of potential production was made, low cost, open-cut mines have been opened in Canada and major economic deposits have been discovered in Niger, Algeria and Brazil.

It is expected Brazil will double its reserves to 200,000 short tons this year and 100,000 short tons were discovered in Niger last year.

The consuming countries are involved in the exploration companies which have made these discoveries.

For the time being at least, it looks as if there is going to be a buyers' rather than a sellers' market for uranium.

For this reason, it appears doubtful that Australia will be able to sell uranium to Europe and maintain the strict safeguards announced by the Fraser Government in 1977.

Australia wishes to deal with Europe as a bloc through Euratom (European Atomic Energy Community) rather than with each buyer individually.



But the European commission has first to agree to Euratom having a mandate to deal with Australia and so far France has blocked this.

Australia has taken the attitude that uranium buyers must give prior consent on both transfers and reprocessing which creates plutonium.

This raises practical problems — uranium oxide can easily go through half a dozen international transfers in Europe before finally reaching its end as stored waste in the dump for all Europe at Cape la Hague, in France.

France is a nuclear weapon State and the French Government has told the Australian Government it would make its own decisions about the use of uranium oxide and it would not distinguish between military and civilian use with two different stockpiles.

While the French Government has no wish to embarrass the Australian Government in embarrassing the Australian Government can successfully insist on prior consent to our strong safeguards, Australia could end up supplying uranium oxide for the French military programme — and ours in the Pacific.

## AUSTRALIA

### BRIEFS

**NUCLEAR DUMPING OUT**--The Government has no plans to dump radioactive waste in ocean waters off Australia. The Minister for National Development, Mr Newman, gave this undertaking in reply to Mr Les Johnson (A.L.P., NSW) [in Parliament]. Mr Newman said Australia had signed the convention on the prevention of marine pollution by dumping wastes and other matter in 1973 but had not ratified the convention. Accordingly, the Government would be required to refrain from action that would defeat the object. [Text] [Canberra THE AUSTRALIAN in English 12 Sep 79 p 7]

**URANIUM BAN URGED**--The NSW convention of the Australian Democrats yesterday called on the Federal Government to ban further sales of uranium. Delegates at the two-day convention passed a motion calling on the Government to ban further sales or contracts for the sale of Australian uranium. [Excerpt] [Sydney THE SYDNEY MORNING HERALD in English 10 Sep 79 p 9]

**JABILUKA DELAYS**--Canberra.--Aboriginal opposition to Pancontinental's Jabiluka uranium project is certain to further delay a start to mining. The Northern Land Council has made it clear it could take months to consider the implications of the company's latest environmental impact statement. Experts would have to be hired and their reports presented during the next few months. Consultation with the council on environmental protection is one of the conditions imposed on the company last week by the Minister for Science and the Environment, Senator Webster. [Text] [Melbourne THE AGE in English 6 Sep 79 p 22]

**QUEENSLAND ORE RADIATION**--Darwin: Uranium ore samples found scattered on a former Queensland Mines exploration site in the uranium province of the Northern Territory were tested to be 85 times the radiation safety level, according to a Mines Department report. The report by the Territory Mines Department to the Jabiru supervising scientist, Mr R. Fry, was released here yesterday by Mr W. Collins (Lab, Arnhem). The report said that open bags of ore samples were found at the camp site in an area where Aborigines hunted. The samples were collected and sent to the Ranger safety engineer at Jabiru for testing. The test showed that the hand-held radiation counter was off the scale at 500 micro-rems per hour. This was 85 times the safe exposure level. The Mines Department has called for a full report. [Excerpts] [Perth THE WEST AUSTRALIAN in English 5 Sep 79 p 9]

QUEENSLAND ENERGY PLANS--The [Queensland] State Government was not yet looking at nuclear power as an alternative energy source, the Mines Minister (Mr. Cass) said yesterday. Mr. Cass, in his weekly radio address to his electorate, said Queensland had ample steaming coal and also was considering a hydroelectric power station on the Burdekin River. [Excerpt] [Brisbane THE COURIER-MAIL in English 3 Sep 79 p 16]

NABARLEK ACCESS ROAD--Darwin: Solicitors acting for traditional land-owners filed a writ in the Northern Territory Supreme Court yesterday to prevent Queensland Mines from using the only access road to the Nabarlek uranium-mining site in Arnhem Land. It was filed on behalf of eight Aboriginal owners of land in the Oenpelli region, near the Nabarlek site. The traditional owners claim that they have never granted permission for Queensland Mines to use the road and that the Northern Land Council was not acting on their behalf when it gave tacit approval. Queensland Mines began mining uranium ore at Nabarlek about four months ago. [Text] [Perth THE WEST AUSTRALIAN in English 1 Sep 79 p 3]

CSO: 5100

## LIBYA CHARGED WITH USING OIL TO OBTAIN NUCLEAR TECHNOLOGY

Kuala Lumpur BUSINESS TIMES in English 30 Aug 79 p 3

[Text]

LIBYA is using oil to pressure India into handing over sophisticated nuclear technology, two Indian newspapers said on Tuesday.

In similar stories, the *Times of India* and the *Hindu* said that the government of Col. Muammar Gaddafi was dissatisfied with the limited scope of a nuclear cooperation agreement signed here last year.

"The Gaddafi regime had evidently thought that with a little bit of arm-twisting, India could be persuaded to take a less rigid view of its policy of not transferring its nuclear technology," the *Hindu* said.

A Libyan diplomat, however, characterised his government's moves as a "friendly nudge."

Last month, Libya suspended an oil arrangement under which India had received 300,000 tons of the 1 million promised this year.

The government-owned Indian Oil Corporation and the Libyan embassy both confirmed the cutoff on Monday, but the Indian Petroleum Ministry denied that shipments had stopped.

Official Indian spokesmen could not be reached on Tuesday to comment on the reported disagreement over the nuclear pact since government offices were

NEW DELHI, Aug. 29

closed in mourning for slain Kari Mehta, who was India's first Governor-General.

Mr Omar Ibrahim Al-Rukhousi, a Libyan diplomat here, said the nuclear stories took his embassy by surprise.

He said it was likely that Tripoli was using its oil resources as a "nudge" to prod policy changes in New Delhi, and he noted that Libya would like a freer hand in recruiting Indian technicians for development projects. In many cases, labour is recruited through Indian government agencies, he explained.

The cutoff, the Libyan official said, was a "friendly nudge."

Problems also arose in the oil agreement, worked out last April after Iranian shipments to India declined, Mr Al-Rukhousi said. He would not elaborate.

The deal was a swap-  
ping arrangement under which India would pick up the contracted oil from a Gulf state, geographically closer to save on shipping costs, and Libya would supply a similar amount to a European customer who would compensate the Gulf producer.

India earlier denied a published report that it had said Libyan crude on the spot market. — AP

JAPAN

BRIEFS

ENRICHMENT PROTOTYPE PLANT—The Power Reactor and Nuclear Fuel Development Corporation, for early realization of a commercial plant, is thinking of starting on designs for a prototype plant (250 tons SWU scale) in JFY 1980 and is requesting the budget for this. [Except] [Tokyo DENKI SHIMBUN in Japanese 13 Sep 79 p 1]

CSO: 5100



## KORI NUCLEAR POWER PLANT IS MOST MISHAP PROOF

Seoul THE KOREA HERALD in English 27 Sep 79 p 8

[Text]

World - renowned nuclear energy experts participating in a recent symposium on nuclear safety focused on the Three Mile Island plant incident have assured that there is no cause for worry as far as Korea's Kori power plant is concerned.

Lectures and discussions were held at the training center of the Korea Atomic Energy Research Institute (KAERI) on Monday sponsored by the International Atomic Energy Agency (IAEA), the Argonne National Laboratory (ANL) and the KAERI.

The lectures for some 100 researchers and students were given by Dr. Van Ery from ANL, Leonard Saffer from the U.S. Nuclear Regulatory Commission (USNRC), Dr. Waddington from the Canadian Atomic Energy Control Board, Denis Ferrigno from the Gilbert Association and Dr. Rim Chang-sang of the KAERI.

## Primary Differences

Dr. Van Ery gave some of the primary differences between U.S. Westinghouse, the supplier of the Kori Unit 1 reactor, and Babcock & Wilcox, which built the TMI Unit reactor.

He indicated that the causes of the accident were the errors of operators violating the basic safety rules combined with equipment malfunctions and concluded that the probability of occurrence of a similar accident sequence to that of TMI was extremely small.

Dr. Rim, manager of the reactor core systems engineering section, said that the probability of a TMI type accident occurring in Kori Unit 1 was extremely low because of the following factors:

Firstly, the time required to dry out the steam generator in Kori is 34 minutes, while that in TMI is 3 minutes.

Secondly, there are three reactor shut-down signals due to the secondary system at Kori, while there is none in TMI.

Thirdly, the feedwater pumping capacity of Kori is larger

than that of TMI; three pumps of 50 percent capacity at Kori versus two pumps of 40 percent capacity at TMI.

Fourthly, the frequency of pressurized relief valve opening in a Kori type plant is only 0.3 per year, while that in a TMI type plant it is four per hour.

Fifthly, the reactor core cooling capability by natural circulation at Kori is better than that at TMI.

Finally, at Kori the containment building is isolated when the emergency coolant enters into the reactor core in the event of an accident, while the containment structure is not isolated at TMI.

The lecturers all agreed that the TMI accident would benefit nuclear plant operators in the long run, although it brought about a tremendous loss of property worth about \$1 billion.

The seminar on nuclear accident was the first ever held in the nation with foreign experts participating.

URANIUM DEMAND EXPECTED TO REACH 8,600 TONS BY 2000

Seoul THE KOREA HERALD in English 3 Oct 79 p 3

[Text]

The nation's annual uranium demand in the year 2000 is expected to come to approximately 8,600 tons.

According to a long-term nuclear fuel demand and supply outlook made by the Federation of Korean Industries (FKI) yesterday, the nation's uranium demand is projected to reach 678 tons per year by 1981 when the Fourth Five-Year Economic Development Plan (1977-1981) comes to an end.

The influential economic organization observed that, the nation is feared to suffer from crippling shortages of uranium supply because of the foreseeable skyrocketing demand for the nuclear fuel material, the estimation of which was put by the FKI at 4,480 tons a year for 1981 and at 8,600 tons a year for the year 2000. In the year 2000, 44 nuclear power plants are projected to go into commercial operation.

Presently, Korea produces no uranium at all and depends entirely on the United States for its demand for the nuclear fuel.

During recent years, some uranium deposits have been confirmed around the Taejon and the Koesan areas but mining experts concluded the deposits contain low-grade uranium of 0.04 per cent and that, even if fully developed, the estimated total deposits do not exceed 1,000 tons, thus are able to meet only one third of the projected demand in 2000.

Not to mention the spiralling international price of uranium which is most likely to be more than double to \$64 by the 1980s from \$38.20 in 1975 and from the projected \$37 in 1980. It was also noted that a tight supply situation is sure to come for world uranium markets, as a non-nuclear proliferation trend is more and more evident among major uranium-producing countries.

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ADDITIONAL FUNDS SOUGHT FOR URANIUM PROSPECTING

Bangkok SIAM RAT in Thai 20 Aug 79 pp 1, 12

[Article: "Requests for an Additional 300 million Baht for Surveys of Uranium Deposits"]

[Text Uranium surveys came to a halt; the Department of Geological Resources requests an additional 300 million Baht, indicating that a sufficient uranium has been discovered.

Mr Bunmai Inthaphut, chief of Survey Project for Radioactive Substance Development, Department of Geological Resources, recently submitted a report to the department's Director General, Mr Phisut Suthat na Ayutthaya regarding the uranium deposit surveys which have been in operation from October 1978 to January 1979, as well as other possibilities resulting from these surveys. The report indicates that even though the amount of uranium found was not very substantial, the mines currently can be improved to yield 4-5 times as much, or 0.1 percent more output, an output that is worth the investment.

According to the report, the first detailed surveys were conducted in the areas of Phu [Hill] Ang-Nam, Phu Pratutima, Phu Prong-yai and Phu Khwang in Khonkaen Province which covered 150 kilometers. The second survey for uranium deposits which was at its initial stage was done in an area of 51 square kilometers in the Phu Kao Hill area in NongSang District of Udon Thani Province. The third survey, also at its initial stage, made use of motor transport and radiation detection equipment, circumscribing a distance of 2,000 kilometers through several provinces, such as Nakhon Ratchasima, Khonkaen, Chaiyaphum, Udonthani, Prachinburi and Nakhon Nayok.

The report indicates that current surveys cannot be made as planned because of mechanical malfunctions, especially to the most important equipment, the carbon-scintillometer, and to the gamma-ray logging scintillometer. Aside from that, 60 percent of 5,000 radiation measuring cups that had been placed at various spots were taken away by villagers for use as drinking cups.

Meanwhile, a source from the Department of Geological Resources told SIAM RAT that the department was preparing a request for a budget of 300 million Baht

for the survey. He also disclosed that the department had perviously proposed to have a private foreign company carry out the survey but the proposal was opposed by military representatives since uranium is a strategic substance to let foreigners know about matters concerning Thailand. The military then suggested that the Department of Geological Resources carry out the survey, in conjunction with Chulalongkorn University's Engineering Faculty, since they have sufficient equipment and experts.

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NUCLEBRAS CHIEF TESTIFIES ON NUCLEAR ACCORD IN SENATE

Rio de Janeiro MANCHETE in Portuguese 22 Sep 79 pp 132-135

[Text of deposition on the Brazilian-German nuclear agreement read before a senate committee by NUCLEBRAS President Paulo Nogueira Batista]

[Text] If there are still any doubts about the Brazilian-German nuclear agreement, it is not for lack of explanations. Last week the president of the Brazilian Nuclear Corporation (NUCLEBRAS), Ambassador Paulo Nogueira Batista, testified on the controversial issue for 18 hours before the members of the congressional investigating committee of the senate. Later, accompanied by the director of NUCLEBRAS, General J. Pinto Rabelo, Minister Said Farhat and Col Rubem Ludwig of the National Security Council, he gave an interview to more than 30 reporters at Planalto Palace. The deposition read at the secret session of the senate as well as a note from the committee, were released on that occasion. This transpired after President Joao Figueiredo had reiterated in Belo Horizonte that the government is upholding and will uphold the German-Brazilian agreement. MANCHETE is publishing the full texts of those documents, which help to better understand the nuclear agreement:

Senator Itamar Franco, chairman of the congressional investigating committee, honorable senators:

I am greatly honored and gratified to be before this congressional investigating committee once again, this time in response to the invitation of His Excellency the president of the federal senate, Senator Luiz Vianna Filho, in accordance with an agreement reached in the plenum of the senate between the majority leaders of this chamber, Senators Jarbas Passarinho and Paulo Brossard, to present clarifications regarding the implementation of the nuclear agreement, at a special session the secret nature of which was appropriately suggested on that occasion by the representative of the opposition party, Senator Franco Montoro, and accepted by this committee.

2. Duly authorized by the minister of mines and energy, Senator Cesar Cals, I immediately placed myself at the disposal of the senate for these clarifications, not only in the belief that that is my duty but also with the



profound conviction that only a direct and permanent understanding with the legislative power will be able to provide the congressmen of all shades of opinion with correct and true information about the execution of the Brazilian nuclear program, which has become the target of a systematic campaign that has taken the form of distorting the facts, taking them out of context, and suppressing explanations. Criticism, which is always necessary when it is objective and not biased, cannot ignore the law, however, and jeopardize the legitimate commercial interests of a company and, even less so, the interests of the country.

Honorable senators:

3. In the nature of an organized campaign, NUCLEBRAS is being accused of having turned over effective control of its subsidiary, NUCLEBRAS Engineering Corporation (NUCLEN), to Kraft-werk Union (KWU), the minority stockholder, which holds 25 percent of the corporate capital.

4. The criticism is based on the following arguments:

(a) In the five-member executive board of directors, KWU names the technical director and the commercial director;

(b) The most important decisions in the administrative council and in the board of directors are always taken by unanimity, which insures the directors and councilors named by KWU the right of veto;

(c) The technical committee comprised of four members named by KWU and one observer designated by the director-superintendent of NUCLEN will always have the last word in decisions of a technical nature, and its viewpoint will prevail even when it differs from that of the NUCLEN board of directors;

5. The widely disseminated accusation goes beyond the totally unfounded charge of NUCLEN control by KWU. It maintains, without any foundation, that NUCLEN's stockholders' agreement represents an act detrimental to the national interest by importing in violation of national sovereignty, by contravening corporation law, by constituting an insurmountable obstacle to the transfer of technology, and finally because it is a transaction that reserves the lion's share of the market to the German partner, underrating the participation of national private enterprise.

6. The enemies of the Brazilian nuclear program insist that the secrecy with which the aforementioned stockholders' agreement is being protected is by itself an indication that it is not in the national interest. According to them, that is why it is being hidden from the national congress--from the approval of which it never should have been excepted--being withheld from the Brazilian business community, which was allegedly deceived about its possibilities of participation in the nuclear program.

7. With regard to the preceding, NUCLEBRAS wishes to make the following clarification:

(a) Stockholders' agreements deal essentially with matters pertaining to the internal management of a company. They govern the relations between partners, and in closed capital companies, as is the case of NUCLEN, may be classified as being for restricted circulation inasmuch as they pertain to material of commercial interest to the stockholders the dissemination of which could involve damage to their legitimate commercial interests. The law does not compel the disclosure of that type of document and court jurisprudence recognizes the right of stockholders to reserve their secrecy. Joint-economy enterprises, organized according to the country's commercial legislation, therefore, are not obliged to publish the stockholders' agreements in which they participate. Nor are they obliged to heed requests to submit documents pertaining to their internal management to congressional investigating committees inasmuch as the law that governs the creation of these bodies merely given them the right to requisition documents pertaining to central public administration organs and agencies. Therefore, response to the request of a congressional investigating committee is, barring better judgment, a voluntary act on the part of companies organized under commercial law.

(b) In the case of NUCLEN's stockholders' agreement, because it is a document pertaining to the implementation of an international agreement and because it contains clauses regulating the activities of NUCLEN abroad, a matter that affects the country's foreign policy, the document also falls within the jurisdiction of other legislation that governs the safeguarding of secret documents of national interest. Thus, NUCLEBRAS could submit it to the congressional investigating committee only with the approval of the government. That legislation stipulates, furthermore, that responsibility for preservation of secrecy rests with anyone who takes cognizance of a document so classified. Therefore, its disclosure, even partial, constitutes a clear violation of legal provisions.

(c) There are clauses in NUCLEN's stockholders' agreement which--in the opinion of NUCLEBRAS as pertains to its commercial interests, and that of the government as pertains to its political-diplomatic interests--fully justify the secrecy adopted. They are the ones that refer to mutual consultation between NUCLEBRAS and KWU with regard to the Latin American market for nuclear plants. It envisages joint action that could assume different forms. In this joint action, NUCLEN and Brazilian industry are guaranteed the supplying of engineering services and equipment for nuclear plants in Latin America, with KWU supplying our neighbors with what cannot be produced in Brazil;

(d) From a reading of those clauses, it is evident that the Brazilian nuclear program did not limit itself to providing for the development of technological and industrial knowhow to take care of the national market. It went further, envisaging the possibility of exporting on a really competitive basis, thanks not only to our own performance capability but also to the technological tradition and prestige of the German partner.

## Political Pressures and Interests

8. It is obvious, honorable senators, that those clauses on the coordination of action in the international area are matters of the greatest sensitivity requiring, as the note issued by the government the day before yesterday stresses, "careful treatment" in order to "preserve the credibility of Brazil and the legitimate interests of the Brazilian company in the face of political pressures and interests different from ours." That, therefore, is the reason for the secrecy, as protection against exploitation by those who, having lost the Brazilian market, would now fear our competition in the near future in the Latin American market. The disclosure of the text of the stockholders' agreement, as can be deduced from a reading of Latin American newspapers, for example, has only served to create difficulties for the future commercial activity of NUCLEN and for the diplomatic action of the Ministry of Foreign Affairs. Whose interests do the consequences of that disclosure serve? Is it not that behavior that merits the criticism of being detrimental to national interests?

Honorable senators:

9. The charge regarding a supposed effective control of NUCLEN by the foreign minor partner is so baseless and irresponsible that it can only be explained as a preconceived attitude of interests possibly upset by the Brazilian nuclear program or by the agreement between Brazil and the FRG, or at the very least, as a hasty judgment stemming from the maliciously selective reading of the text, highlighting certain clauses or passages.

10. The objectives of transferral of technology and promotion of national private enterprise, which are, along with the generation of electricity, the keystones of the Brazilian nuclear program and of the German-Brazilian government agreement, can only be achieved, honorable senators, by a process of progressive national development of knowhow in the areas of engineering and the manufacture of components. Such knowhow, at high quality levels, is essential not only to take care of the internal market but also to gain a share of the growing international market for services and products in the nuclear area.

11. The transfer of technology, especially in the nuclear area, has to take place under conditions of complete safety. In the case of NUCLEN, what we desired and what we achieved was the arrangement embodied in the stockholders' agreement, which reconciles the maximum intensification of the rate of transfer of technology with the maximum safety that is required in the construction of nucleo-electric plants, whether in terms of the volume of investment--about \$2 billion per plant--or the high standards of quality that have to be met.

12. The principal aim of NUCLEN is to give Brazil engineering capability in the area of basic planning of nucleo-electric plants with a view not only to autonomy in that sector, which provides access to "know-why," the wherefore of the solutions, but also to autonomy in the engineering area of specifications and purchasing, without which the promotion of national industry becomes more difficult.



13. Honorable senators, control of NUCLEN is firmly in the hands of NUCLEBRAS, which is its major partner. That is expressed not only in the statutes but also in the stockholders' agreement itself and reflected in the day-to-day administration of NUCLEN.

14. The rights recognized to KWU with reference, for example, to the naming of the technical director or the existence of a technical committee, do not affect the control which NUCLEBRAS actually holds and are in strict correlation with the obligations that KWU assumed with regard to the transfer of technology and with reference to its direct technical responsibility to NUCLEN's clients for the quality of the work it performs. Since at the present time Brazil does not have its own knowhow to plan nucleo-electric plants, the system agreed upon in NUCLEN is without a shadow of a doubt the one that best serves national interests. The alternative would be to import the basic project in the form of a "black box," as occurred with Angra-1, purchased from Westinghouse; or to seek to obtain a license abroad--which would not be at all easy--to try to formulate the project in Brazil on our own responsibility, a contingency in which we would necessarily have to resort to foreign consultants, who in that capacity, however, would not assume any responsibility for the results.

15. Between the extreme alternatives of complete responsibility of the supplier without access to technology by the purchaser--the case of Angra-1--and that of developing everything in Brazil, utilizing technology without any responsibility on the part of its supplier, we opted for the solution that combines the transfer of technology with a guarantee on the part of the grantor of the quality of the services produced with the technology being transferred.

16. In the arrangement adopted in NUCLEN, as in other NUCLEBRAS subsidiaries, we have the supplier of the technology deeply committed to the success of the undertaking, either as a partner interested in getting a return on his investment, even though it is a minority share, or as responsible for its management in the technical area, where its name, its trade mark, gives the necessary confidence to the initial clients. Without the technical backing of KWU, Furnas very properly would not be willing to accept the services of NUCLEN, which could not, as it still cannot, substantiate experience and tradition. It is noteworthy that in addition to direct and specific coresponsibility in relation to Furnas for the services which NUCLEN provides it in Angra-2 and Angra-3, KWU assumes an overall guarantee in relation to Furnas for the operation and safety of the plant, which includes the services of NUCLEN and of the national companies promoted by it. All of this, within a dynamic process of progressively developing the knowhow of Brazilian engineers in order to make it possible for NUCLEN in time to assume increasing and, ultimately, final responsibility in the technical area. And that is what is expressed and spelled out throughout the stockholders' agreement in a manner that unquestionably safeguards legitimate national interests. The technical committee, which in some stories was described as a body that is above the board of directors, is nothing more than an advisory organ of the board, which meets only under special circumstances--which has not

happened until now--to give the consent of KWU--and for that reason all of its members are named by it--to plan modifications or decisions that may jeopardize KWU's technical responsibility for the quality of NUCLEN's work. In case the board of directors does not accept the technical committee's viewpoint, which has to be substantiated and followed throughout its formulation by the Brazilian observer, KWU will simply have the right to suspend, partially or completely as the case may be, its technical responsibilities directly assumed with the purchaser of NUCLEN's services, to the electric service concessionaires, responsibilities which would then devolve upon NUCLEN. There is nothing more reasonable and at the same time more appropriate to verify the sense of responsibility of NUCLEN's board of directors in the taking of decisions, which prevail over those of the technical committee, no subordination of any kind being involved.

17. In the course of time, NUCLEN's organization will undergo constant adjustments to reflect the increase of Brazilian knowhow, which is already underway. At the moment that NUCLEBRAS considers that NUCLEN is in a position to assume full and exclusive technical responsibility toward its clients in relation to the new plants, all it has to do is to declare this fact to KWU. At that time a substantial reorganization of NUCLEN will be made in order to limit the action of the German technical director and the scope of the technical committee to only the projects already initiated under the coresponsibility of KWU, until the irrefragable conclusion.

18. It was envisaged that that declaration might be made following the beginning of construction of the fourth plant of the program of eight 1,200 MW units on which the cooperation with the FRG is based. However, it is not very likely that that decision will occur before completion of construction of two plants. In any case, assumption of full responsibility by NUCLEN with reference to our projects will occur automatically and mandatorily after the fourth plant is commissioned.

19. Only out of malice or glaring ignorance can anyone try to describe such arrangements as contrary to the national sovereignty or detrimental to the country's interests. It is precisely those hastily criticised procedures that insure implementation of the full transfer and complete assimilation of technology and provide that process conditions of maximum safety in the best sense--we are convinced--of the national interest.

#### NUCLEN's Stockholders' Agreement

Honorable senators,

20. In strictly statutory terms which in the final analysis prevail over the stockholders' agreement, we can at any time fully exercise NUCLEN's decision-making power contrary to the technical opinion of the foreign partner. We do not do it because it is not in the national interest, for the simple reason that we do not yet have the necessary technological



capability to assume the onus of such a decision, whether in relation to the concessionary clients of electric services or in relation to the safety of the population.

21. The signing of the stockholders' agreement is a normal commercial practice by which the partners of a company complement legal and statutory regulations and precisely define their reciprocal relationship. It is a universally widespread procedure which began in Brazil in the seventies in joint-ventures promoted by the National Economic Development Bank (BNDE) and later by the Brazilian Petroleum Corporation (Petrobras) in the petrochemical area. Stockholders' agreements are expressly recognized by the current corporation law, which by definition they cannot supersede. In the case of NUCLEN, the stockholders' agreement was submitted by NUCLEBRAS to his excellency the minister of mines and energy and by him to his excellency the president of the republic, together with the decree that approved the creation of NUCLEN.

22. One of the principal aims of that corporation law is the protection of the legitimate interests of minor partners, establishing and recognizing, without detriment to the control of the major partner, limits to its arbitrary discretion in running the company. For that reason, it provides for the right of mandatory minimum representation of minority stockholders in management organs.

23. The law does not prohibit the major partner in stockholders' agreements from agreeing to the need for the affirmative vote of the minor partner for decisions on budgetary and financial questions or those related to stock capital which imply obligations additional to those agreed upon at the time of the establishment of the corporation. That concession does not mean relinquishing control of the company.

24. According to the aforementioned strategy of involving the supplier of the technology to the maximum, the government considered it in the national interest to have KWU as NUCLEBRAS' partner in NUCLEN, sharing the management of the company with us while the transfer of technology is underway, technology, moreover, which was denied us by other countries, which still try to impede it. It is worth noting that the technology of pressurized light-water reactors, the most modern being used in the world at the present time, will still be in use for some decades, coexisting by the end of this century with the fast-breeder reactors, which depend on the present reactors to produce the plutonium necessary for their initial operation.

25. Of the criticism made against the stockholders' agreement, the one referring to underrating the manufacturing potential of national companies is a particularly gross falsification of the facts. The stockholders' agreement includes a table with the progressive index of nationalization of the manufacture of components, a table which the critics hastened to call "disreal" because it allegedly represented a maximum ceiling below the capacity of our private manufacturers and had been negotiated without their knowledge.

26. However, the facts are entirely different. In the first place, as may be verified in the text, the index is not maximum but minimum and can be superseded not only by transferring components already contracted as imports for Angra-2 and Angra-3 to the area of national supply but also, in future plants, by the active promotion of Brazilian industries. Specifically, this possibility of transfer is already occurring as in the case of the pressurizer for Angra-3, the manufacture of which was suspended in Europe to permit it to be built by the NUCLEBRAS Heavy Equipment Corporation (NUCLEP), which merely depends on the concurrence of Furnas.

27. In the second place, those minimum indices were established by studies carried out at the National Nuclear Energy Council (CNEN), based on a survey ordered from the American company, Bechtel, and concluded before the creation of NUCLEBRAS and the signing of the agreement with the FRG. Bechtel's survey was based on detailed consultation with national manufacturers. It was appreciably expanded by NUCLEBRAS in order to include, for example, the manufacture in Brazil of components of the nuclear system of steam generation (SNGV).

28. It was on the basis of these studies that the minimum indices of nationalization of components were drawn up. Those indices, exactly as they appear in NUCLEN's stockholders' agreement and in other contracts, served as the framework for verbal and written agreements between NUCLEBRAS and the Brazilian Association for the Development of Basic Industry (ABDIB) in early 1975 at meetings held in Rio de Janeiro and Sao Paulo, which included the participation of the minister of mines and energy, the secretary general of the Ministry of Industry and Commerce, and directors of the National Economic Development Bank (BNDE), therefore, long before the signing of the diplomatic agreement and the industrial protocol in June of that year and of the creation of NUCLEN in December of the same year. It was on the basis of those indices of nationalization that the division of labor was agreed upon with ABDIB, according to which NUCLEBRAS, through NUCLEP, would retain the manufacture of heavy nuclear components of the nuclear system for the generation of steam (SNGV), while the other components would be taken care of by Brazilian industry. It was as a result of those contacts, in the course of which the private industries took cognizance of NUCLEP's plan and refused to participate in it, that the market guarantee protocol was negotiated in September 1976 with the Cobrasma, Confab and Bardella companies. At a session of the Mines and Energy Committee of the federal senate on 9 October 1975, at the time the nuclear agreement was being considered by the national congress, I had occasion to disclose the aforementioned nationalization indices which, incidentally, are five times higher for Angra-2 than they were for Angra-1, and to my knowledge, in the case of that plant, there was no protest of any kind.

29. NUCLEN's Industrial Promotion Board, headed by Brazilians, has already taken a census of 300 national industries for the supplying of materials and components and continues its qualifying task, furnishing those industries

with manufacturing specifications, which require quality that is not common in our industrial park; and it is actually beginning to promote them, either by the market guarantee it offers or the transfer of "knowhow" which it coordinates and promotes.

30. In the light of these well-known and indisputable facts, how can one understand the charge of withholding knowledge of those indices from national industry?

31. The discussion of NUCLEN's procedures with regard to the transfer of technology and the discussion of the clauses pertaining to the nationalization of the manufacture of components leads us naturally to the question of the magnitude and pace of the program of nucleo-electric power plants. The eight plants envisaged in the Brazilian nuclear program correspond to the estimate made by the Brazilian Electric Power Corporation (ELETROBRAS) in drawing up Plan-90, before the creation of NUCLEBRAS and the signing of the German-Brazilian agreement. It was a proposal based on a forecast of the electric energy market increasing at the rate of 11 percent per year, a forecast that is being exceeded, according to ELETROBRAS official figures, which totally refute allegations of the enemies of the Brazilian nuclear program when they testified before this congressional investigation committee.

#### Autonomy in Nuclear Engineering

32. The magnitude of eight plants is justified not only in energy terms but above all in industrial and technological terms. A program of eight power plants, in addition to having given us the bargaining power to gain access to technology, inaccessible in isolated purchases of the Angra-1 type, makes it possible to plan and execute subprograms of transfer of technology and industrial knowhow. The construction of one, two or three plants, or even the construction of more units, without the proper continuity and pace would make it impossible to achieve the objectives of the assimilation and, particularly, the establishment of technology in terms of technical staffs permanently committed to the successive activities involved in the construction of a nuclear plant; and it would make it impossible also to achieve the goals of nationalization of the manufacture of components, an endeavor that only becomes feasible with the guarantee of a market that will provide a return on the investments which the Brazilian industrialists will have to make, such investments being necessary to qualify for production for nuclear purposes. In both cases, standardization of the project that is being realized in an eight-plant program is essential. After all, honorable senators, technology is a perishable asset. When not exercised constantly, it is lost in time and new teams will have to be formed, painfully and with the same effort, starting the whole process over again.

Honorable senators,

33. Before beginning the reading with comments of NUCLEN's stockholders' agreement, clause by clause, I would like, if you will permit me, to make



an observation. Notwithstanding the importance of the Brazilian nuclear program, whether by the contribution it will make in the medium and long term to taking care of the electric energy market, or the contribution it will make in the shorter term in terms of sophistication of the country's technological and industrial capacity--the almost obsessive attention being devoted to the Brazilian nuclear program is certainly disproportionate in the context of the innumerable problems that affect us in the area of energy. How is one to understand that strange mobilization of efforts to oppose an energy program that has been resolved and is in full execution when there are still so many new energy areas with programs that need to be defined? How is one to understand also the insistence on not recognizing the advisability of preparing ourselves, appropriately in advance, for the intensive use in the medium and long term of a primary source of energy--uranium--which we have in substantial quantities? How is one to understand, finally, the doubt raised with regard to the energy need for the Brazilian nuclear program, thus lending arguments to those at the international level who seek to encumber it with the suspicion of nonpeaceful intentions?

34. What we need in evaluating the Brazilian nuclear program, or any other energy solution for that matter, is much objectivity and calmness. The thousands of Brazilians, the scores of firms that are already engaged in its execution need tranquillity and the confidence of everyone, particularly of those, like the members of this chamber, who are invested with popular representation, in order that they may respond effectively to the challenge which the program represents. Those who work in the organs responsible for the implementation of government policy in the nuclear area cannot and should not be placed under constant suspicion, called upon daily to prove the legitimacy of their purposes and the correctness of their behavior; all that as a result of the unfounded allegations of those who only raise doubts, most of the time anonymously, without in any case assuming the corresponding burden of proof, as the most elementary rules of ethics and proper social intercourse dictate.

35. This stage of the deposition I have just made has centered on the question of control of NUCLEN, the matter that has been in the news and which sparked this special and secret session of the congressional investigating committee. I am naturally at the disposal of the honorable senators to respond also with regard to other aspects pertaining to the implementation of the nuclear agreement, once the examination of NUCLEN's stockholders' agreement, clause by clause, is completed.

#### The Note of the Congressional Investigating Committee:

The congressional investigating committee met to hear the deposition of Ambassador Paulo Nogueira Batista, president of NUCLEBRAS, who furnished clarifications regarding the nuclear agreement with the FRG and its implementation, particularly regarding NUCLEN's stockholders' agreement, as a result of its publication by the press.

The congressional investigating committee concluded that during the discussions, some information was provided which justified the secret nature of the session as a whole. Both the majority and the minority believe that questions of national interest supersede party differences.

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C90: 5100



NUCLEBRAS PRESIDENT SEES CONTINUATION OF NUCLEAR PROGRAM

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Sep 79 p 6

[Text] Porto Alegre--The president of the Brazilian Nuclear Corporation (NUCLEBRAS), Paulo Nogueira Batista, said in Porto Alegre yesterday that there is no possibility of turning back in the Brazilian nuclear program and it is not correct to say that the nuclear technology the country is acquiring under the West German agreement will be superseded by the year 2000. These explanations were given by the president of NUCLEBRAS after the signing of a contract with the Science and Technology Foundation of Rio Grande do Sul, which took place in Pirantini Palace in the presence of Governor Amaral de Souza, the objective of which is to develop a project for the gasification of mineral coal utilizing heat generated by a nuclear reactor.

Paulo Nogueira Batista said that the nuclear program has been the object of much criticism. Although he does not believe that there is a "campaign" against the agreement, he observed that "at a given moment, the volume, the frequency and the tone of the criticism have assumed characteristics that give us reason to suppose that it is coordinated." Batista said that "authentic public opinion has no reservations" about the nuclear program but he acknowledged that there may be "some lack of information and a bit of bad faith on the part of some newspapers." He said, further, that the discussion has been broad and that he is willing to return to congress as many times as may be necessary to speak about the matter.

With regard to the geologic faults, the president of NUCLEBRAS guaranteed that the Angra dos Reis region "has no sign of seismicity that would make it inadvisable to build nuclear plants there." In his opinion, the delay in the construction of the plants "is not very significant" and the new plants, in his opinion, will depend on the demand for electric energy. With regard to the Latin American market, Nogueira Batista observed that there is the possibility of carrying out joint work with the German partners. He gave assurance, further, that Brazil has complete control over decisions in the NUCLEBRAS Engineering Corporation (NUCLEN) area and justified his opinion by citing the increase of the level of nationalization in Angra-2 from 30 to 34 percent.

## Contract

The contract signed by him in Porto Alegre in the amount of 31 million cruzeiros will be carried out in 2 years and if the gasification of coal with a high cinder content through the external use of heat proves to be feasible, a new prospect will open up for the use of nuclear energy.

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## BRAZIL

### INDUSTRIALISTS REFUTE NUCLEBRAS CHIEF'S CHARGES

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Sep 79 p 6

[Text] It was the Brazilian Government that, in order to attract the national capital goods industry, offered them a reserved market, conditioned of course on the prices of the equipment produced in the country. It was the Brazilian Government also that was responsible for selecting the national manufacturers (with the help of the German company, Kraft-werk Union (KWU)) and that officially invited them to join together in a consortium.

The terms of this consortium were established in a memorandum drafted by Paulo Nogueira Batista, president of the Brazilian Nuclear Corporation (NUCLEBRAS), and presented to the national manufacturers in March of 1976. It was for these and other reasons that in Sao Paulo yesterday the industrialists Claudio Bardella, Marcos Xavier da Silveira and Gastao Vidigal Neto, of Bardella, Cobrasma and Confab, received with surprise the charges leveled by Senator Dirceu Cardoso (Brazilian Democratic Movement--MDB--for Espirito Santo) and by the president of NUCLEBRAS, Paulo Nogueira Batista, himself, to the effect that when Bardella was president of the Brazilian Association for the Development of Basic Industry (ABDIB), he had manipulated the contracts between NUCLEBRAS and other private companies in favor of the aforementioned firms.

Claudio Bardella is reserving all explanations regarding the charges for his testimony before the nuclear congressional investigating committee but he said in an official note yesterday that "until now the Bardella company has not received any amount that could even cover the costs already incurred in the development of human resources, technical studies and absorption of technology required for development of the production of nuclear equipment." Marcos Xavier da Silveira, of Cobrasma, attributed the charges to "misinterpretation," and Gastao Vidigal Neto, president of Confab, repeated that the consortium was formed at the direction of the government.

Perhaps because he was not directly involved in the charges, Julio Cesar de Queiroz, first vice president of ABDIB and vice president of Promon Engineering, was the most objective: "If there is a cartel, it is German." According

to him Bardella, Cobrasma and Confab joined in a consortium "to break the German circle around the agreement and the supplying of equipment."

Julio Queiroz said that the participation of national engineering in the Brazilian nuclear program was greater in Angra-1 (plant acquired by Brazil from Westinghouse) than in Angra-2 (from the Germans). "The participation of Brazilian engineering in the nuclear program is decreasing both qualitatively and quantitatively," he observed.

As for the charges that national industry (principally those in the board of directors of ABDIE) formed a cartel, Julio Queiroz added that "because of the reservation regarding the disclosure of the nuclear program agreements, the information is partial and judgments are made about them on the basis of partial data. It is for that reason that we have now reached the point of disputing commercial practices recognized and used throughout the world."

Bardella, Gastao Vidigal and Marcos Xavier da Silveira recalled that even before the agreement was signed, the Brazilian Government initiated a study of the capability of the national equipment industry to produce nuclear components. Bechtel Overseas, one of the largest engineering companies in the world, was contracted and selected 78 industries. After the agreement with the Germans, the KWU consortium insisted on reselecting the industries and arrived at four. Since the Brazilian Government demanded preference for the Brazilian industries, there remained the three of the present consortium plus Villares (which was not accepted) and Jaragua and Dedini (which were not interested).

Claudio Bardella recalled that "the sixth clause of the protocol signed between the national manufacturers and NUCLEBRAS establishes a reserved share of the market conditioned on the prices of the equipment produced by national industry." That means, explained Bardella, that if the national manufacturers quote prices considered to be higher than international prices, NUCLEBRAS can purchase the same equipment from the Germans or even from other national industries. "How can one speak of a cartel under those terms?" added Xavier da Silveira.

#### Note

This is the full text of the official note distributed yesterday by industrialist Claudio Bardella:

"I will be extremely pleased to appear before the nuclear congressional investigating committee where all the necessary clarifications will be made to the members of the committee. Before that, however, I wish to offer the following clarifications to the public:

1. Up to the present date, the Bardella company has not received any order for Angra-2 and Angra-3.

2. For the time being, our participation in the Brazilian nuclear program is restricted to supplying two traveling gantries to Westinghouse for Angra-1, through international bids, Westinghouse having received the Angra-1 order directly from Furnas in the form of a "turnkey job."

3. For the remainder of the program, there was simply signed a market guarantee protocol for mechanical components for Angra-2 and 3, a protocol in which we participate by decision of NUCLEBRAS after the conclusion of a study regarding the capability of production of nuclear equipment conducted by the American company, Bechtel Overseas, later revised by KWU and NUCLEN, which resulted in the selection of four companies--among them Bardella--technically in a position to fulfill the agreement with the requisites necessary for nuclear quality, together with the decision of the government to give preference to national companies for the execution of part of the Brazilian nuclear program.

4. It is important to stress also that Bardella has not received any amount that could even cover the costs already incurred in the development of human resources, technical studies and the absorption of technology required for development of the production of equipment for nuclear plants."

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FRG NUCLEAR INDUSTRY CRITICIZED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 24, 25, 26 Sep 79

[Three-part article by O ESTADO Bonn correspondent Assis Mendonca: "Germany's Nuclear Crisis"]

[24 Sep 79, p 10]

[Text] Part of the eight generators and pressure vessels, in the amount of 100 million marks, ordered from Gutehoffnungshuette by KWU for use in the Angra dos Reis reactors, are ready for delivery, an official of that equipment producing industry revealed yesterday. According to the president of KWU, Klaus Barthelt, the contract with Brazil is the only export contract being fulfilled today by the FRG and without it "the German nuclear industry would have failed long ago."

The Gutehoffnungshuette official did not say, however, when that equipment will be shipped to Brazil inasmuch as the civil engineering works of the first of the German reactors, Angra-2, are quite behind schedule because of the difficulty with the terrain chosen.

The fact that the German industries are meeting the production schedule of the orders to the letter is nothing new. The unusual thing in the case is the fact that Gutehoffnungshuette should concentrate such a large number of highly skilled technical personnel to fulfill a few orders. According to the president of the company, Wolfram Thiele, since 1975 Gutehoffnungshuette has not received any domestic order in Germany, and since 1977 also any new orders from abroad.

The firm is the only producer in West Germany of generators and pressure vessels for atomic reactors. The 7,000 highly specialized technicians who are working in the Sterkrade factory will become unemployed shortly, the president of the company predicted, if the German Government does not decide immediately to continue with the nuclear program practically suspended in 1975.

The Gutehoffnungshuette technicians are not the only ones threatened. There is a total of about 150,000 persons who directly or indirectly are connected



with the German nuclear industry and whose jobs are threatened. Since 1975, there have not been any more orders for reactors and the projects already started have already undergone long delays--two of them were suspended by court decision.

That year, KWU and other companies connected with the nuclear sector in Germany received the last six domestic orders for reactors, for projects that have not been able to be initiated to this day. The German nuclear industry became dependent on the foreign market, where it faces the competition of Americans, Canadians and the French, mainly.

The contract with Brazil, for example, began to be calculated not only in terms of its monetary value but also in terms of the number of jobs it assured. According to a KWU director, in an interview given in March of last year to the newspaper NEUER RUHR ZEITUNG, the contract with Brazil assured 20,000 direct jobs in the German industry. At that time, export business represented more than 60 percent of KWU's total volume of 4.2 billion marks annually and assuming ever greater importance.

In order to keep its personnel occupied, KWU began to accept domestic orders for components at cost-price, build turbines and conventional generators for Colombia, sea-water desalination units for Saudi Arabia and resumed its serial production of small products such as 60 to 100 megawatt turbines.

The contract with Brazil was viewed from the outset by German industry as the salvation for survival from the approaching crisis. Following the signing of the agreement with Brazil, KWU succeeded in signing other large contracts with Iran when the shah was still in power.

If all the reactors planned--though not ordered--in Brazil and Iran were built, that would mean a transaction in excess of 20 billion marks for KWU, which would enable the company to remain unconcerned in a general crisis in that sector in Germany and to look for a way out of the impasse.

The importance of the export contracts was acknowledged several times by KWU president, Klaus Barthelt, who said in an interview with the newspaper DIE WELT on 12 June 1978 that "the manufacturers of atomic plants in Germany would have failed long ago if it were not for contracts from abroad."

The change of the political situation in Iran, in the meantime, also changed the outlook for the German nuclear industry. Shortly before the shah was overthrown, when the popular revolt already foretold the end of the regime, the chief of KWU declared that a possible cancellation of the deals with Iran could even have "personal consequences" for German businessmen. According to Barthelt, the magnitude of the crisis would depend on the possibilities of compensation for the cancellation through new orders. When the cancellation was made, however, no new contract was concluded to compensate for the losses.

Since the cancellation of the contract with Iran, the Brazilian orders are practically the main source of KWU income.

The contract with Brazil is the only export contract, without which "the German nuclear industry would have failed a long time ago," as the president of KWU once admitted. That report is confirmed, furthermore, by the facts. Even before the cancellation of the contracts with Iran, the crisis was already being felt in a concrete manner. Of the 700 small firms that supply components to KWU, almost all those that employed less than 200 people had already declared bankruptcy in November of last year.

Despite the crisis and the threat of loss of mastery of a technology the development of which cost over 20 years of research, no German politician is insisting on the continuation of the nuclear program at any price. The defenders of atomic energy such as the governor of Lower Saxony, Ernst Albrecht, for example, are aware that the attempt to impose the construction of plants against the popular will would be a fatal political error and that the only irreversible thing in any nuclear program is radioactive contamination.

[25 Sep 79, p 6]

[Text] Nuclear ruin is now another pebble in the shoe of the already calloused but still surprised German nuclear industry. That the very expensive reactors would one day have to be dismantled and that that would cost a lot of money, intensive research and great risks, was all part of the planning of the atomic industry. But that that day would arrive so soon and that there would not be any dump for the radioactive parts of the reactors was almost a surprise for the technicians and manufacturers of nuclear equipment. A greater surprise still was to have to dismantle a reactor, the Niederaichbach reactor, built only a few years ago.

That plant is located a few kilometers from Munich near the picturesque medieval town of Landshut. Its construction took 6 years and cost a total of 230 million marks. The reactor, built by KWU to the order of the Karlsruhe Nuclear Research Center, began to be built in 1966 and was supposed to establish the bases for a new technology, a blend of a cadmium reactor and hydraulic reactor. The experiment was intended to explore a system that would permit the use of common turbines powered by steam heated above 500 degrees centigrade through nuclear processing.

When the reactor was ready, however, that process had already been completely superseded, being even considered uneconomical. The reactor worked for 18 months at reduced capacity and only 12 days at full capacity. Since 1974 it has been turned off and even so it costs the Karlsruhe Research Center 150,000 marks per year.

The demolition of Niederaichbach will take between 4 and 5 years and will cost about 80 million marks. The appropriations for the dismantlement of

the plant will come out of the German federal treasury and will represent an increase of more than 200 [as published] percent over the appropriation of 37 million marks initially allocated for research on the demolition of atomic plants for the period 1977-1980.

Not only is technology superseded rapidly but also the estimates of the cost of projects and research. The Niederaichbach experimental reactor now assumes another important aspect. With its demolition, the German Government plans to establish what would be a "technological model for the final elimination" of reactors since this is the first time that such a task is being carried out in Germany.

Two or three reactors have already been dismantled in the United States but details about the method used have not been revealed which leads to the conclusion that that technical knowhow in this area is still extremely unreliable. In Europe, only one reactor has been dismantled up to now; a small unit in the city of Lucerne, Switzerland, which cannot be taken as a model of the technique employed because of the reactor's small capacity.

Two firms have been charged with planning the process of demolition of the reactor; one is a heavy machinery firm and the other a nuclear engineering firm. Most of the work will have to be carried out by remote control, because even with protective suits, the level of radioactivity would be fatal to anyone.

The plant will be dismantled beginning with the most contaminated components which will be broken down into small pieces so as to be enclosed within approximately 4,000 barrels of reinforced concrete. The barrels containing the atomic waste would then be sent to the Gorleben dump for radioactive wastes, the construction of which has been suspended.

Authorization for beginning the demolition of the reactor, however, will be given by the Bavarian state government only when the final disposition of the barrels with the atomic waste has been clarified.

[26 Sep 79 p 6]

[Text] For the German nuclear industry, the lean years began in 1975. Despite the euphoria with which the report of the signing of the contract of nuclear cooperation with Brazil was publicized, which would mean the sale of eight reactors and one unit for the enrichment and reuse of uranium, the crisis was already beginning to take shape. The mistrust of the population with regard to the safety of the atomic reactors had already begun its course in 1974 reaching such a level of mobilization a few years later that some politicians even termed it the "foreshadow of civil war."

But it was not only the spirit of the population that in 1975 foreshadowed the beginning of a crisis. Several facts showed the course the German nuclear

industry would take from then on: the search for a foreign market as an option to the threat of stagnation of the construction of reactors in West German territory. Two events in 1975 provided the reference points for the policy that would be followed: on the one hand, the judicial embargo based on a suit brought by a "buergerinitiative" (a sort of citizens association that is similar to neighborhood associations common in the large Brazilian cities) against the construction of the atomic plant in Wyl, in southern Germany. The company concerned appealed the unprecedented decision of the court and the case today is still without a final decision. In the meantime, the project is still held up.

The other side of the coin, the hope for the manufacturers of atomic plants in Germany, was the signing of the agreement with Brazil. It was the beginning of the German policy of exporting nuclear technology and, more than that, the opening of a foreign market for the equipment produced by Germany in that field. Since the time of the signing of the contract with Brazil, the German nuclear industry became dependent almost exclusively on exports, inasmuch as no new reactor orders were placed within the country since 1975.

### Plans

The result of popular opposition to the development of the German nuclear program can be easily assessed, beginning with the lag between planning and the implementation of the plans for the construction of atomic plants.

The projects for four reactors with a total of 5,228 megawatts have been delayed 2-1/2 years; four other reactors with a total of 4,374 megawatts have been delayed approximately 5 years; and finally, two other reactors with a total of 1,708 megawatts have been suspended for about 6 years. This means that 10 of the 16 reactors planned by Germany are off their timetable. Others are still within the plan only because the projects have not been initiated in practice. The moment an attempt is made to begin preparations for their construction, they will be subject to the threat of suspension or delay as occurred with the others.

The reasons for the popular mobilization against atomic energy become clear when one analyzes the history of the 15 reactors currently in operation in Germany. Of that number, three are shut down because they have serious defects; Gundremmingen and Lingen, since 1977, Brunsbuettel, since 1978. Two others, Biblis and Stade, are authorized to operate partially because they are considered unsafe to operate under high pressure. The Ohu and Kahl plants have already been shut down several times due to more or less serious accidents. Highly radioactive gases, though in a small amount, escaped once from a small research reactor in Karlsruhe. And the Obrigheim, in operation since 1969, is regarded as dangerous by the technicians because the "antiquated" model does not have protection against external threats.



## Protest

The popular protest against the German nuclear policy reached its peak when the government ordered the beginning of drilling in Gorleben for construction of the first atomic waste dump in the country. That is a highly controversial project. While technicians connected with the German government or the nuclear industry declare that the dump for radioactive waste is completely safe the way it was planned, university professors and independent scientists call attention to important details ignored in the study of the risks. The terrain chosen, a rock-salt formation, is allegedly inappropriate.

Even before the protest movement, the governor of the state of Lower Saxony in whose territory Gorleben hill is located, Social Democrat Ernest Albrecht, suggested to the federal government that it seek "possible alternatives" such as Greenland, some desert in the United States. He even mentioned the Amazon jungle. In March of this year, when the test drilling was going to begin, thousands of activists occupied the site and the governor had to cancel authorization to execute the project. But the permission to make test bores was maintained.

With Albrecht's decision, it became necessary to find a temporary solution for the atomic waste. For some time, France had refused to continue to receive Germany's radioactive wastes because the capacity of its dump in Normandy was practically exhausted. According to information from French authorities there was a possibility that France would again accept the atomic waste beginning in 1981 after the French dump has been expanded. However, the acceptance would be limited and until that time, the largest German reactor, Biblis, is shut down because of the lack of a dump for its wastes. The solution was the construction of small temporary dumps of a quite unreliable nature. Authorization to build them was requested only after the completion of the project. These improvised dumps are already being used although authorization for the project has not yet been decided upon.

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C80: 5100

PHYSICS PROFESSOR CRITICIZES NUCLEAR PROGRAM WITH FRG

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Sep 79 p 5

[Text] Brasilia-- Prof Luiz Pinguelli Rosa of the Physics Institute of the Federal University of Rio de Janeiro told the members of the science and technology committee of the chamber of deputies in Brasilia yesterday that Brazil may have been the victim of a "nuclear confidence game" in concluding an agreement with Germany envisaging the transfer of technology and the construction of several reactors.

Pinguelli Rosa advocated the complete revision of the agreement in order to modify the "nature of the companies involved in it" and transform the Brazilian Nuclear Corporation (NUCLEBRAS) "into a genuinely Brazilian company for the manufacture of equipment for the generation of energy." Later he explained that Brazil "possesses the greatest market for turbines and the production of hydroelectric energy in the world."

The professor also advocated transformation of the NUCLEBRAS Engineering Corporation (NUCLEN) into a basic engineering, project planning, company; the establishment of a Latin American policy in the nuclear area on behalf of the safety of the continent itself; and the need to democratize the decisions in the nuclear field, which must be questioned and developed "with the participation of the whole national community."

The professor said that the Brazilian option in the nuclear field was taken prematurely, stressing that "only 30 years from now, when the national hydroelectric potention is exhausted, will the country need to use other energy sources."

"Up to the year 2000, he continued, the national demand for energy will be fully met by conventional sources and, to judge by official statements, the idea of nuclear energy being competitive with that of hydraulic origin has even been abandoned, inasmuch as a nuclear kilowatt will cost \$7,000, which is three times higher than a kilowatt from Itaipu, the highest dam in the country."

In the opinion of Prof Luiz Pinguelli Rosa, "when Brazil adopted its nuclear opinion, it was not concerned about the cost of the generation of energy but



with mastering atomic energy knowhow, both for peaceful and military purposes." He declared that the Germans are transferring units, assembling nuclear plants on Brazilian territory but "never teaching technicians and showing the way that may later lead the country to self-determination in that sector."

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C80: 5100

# BRAZILIAN NUCLEAR KNOWHOW COULD BE EXPORTED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 26 Sep 79 p 6

[Text] Minister of Mines and Energy Cesar Cals said in Rio yesterday that there is a great possibility of Brazil exporting nuclear technology to several countries, especially those in Latin America, notably Mexico. He added that agreements in that regard are already under study. The statements were made at the opening of the seminar on Brazilian-Mexican trade relations.

Cals considered the balance sheet between what is right and what is wrong about the Brazilian-German agreement to be on the positive side, guaranteeing once again that it will be maintained, not as a matter of honor but because the country needs nuclear technology. In his opinion, the greatest benefit stemming from the atomic program was industrial improvement, which will enable Brazil to enter into partnerships with other countries.

The minister believed that the country has taken a technological leap by entering the nuclear age, including enabling other countries "to come to us because they know that we do not have any hegemonic aims." He said, further, that Brazil is moving calmly moving ahead with the prospecting and concentration of uranium and the manufacture of nuclear components.

Brasilia: The chairman of the nuclear congressional investigation committee, Senator Itamar Franco (Brazilian Democratic Movement--MDB--for Minas Gerais) said yesterday that he is going to refuse to participate today in the meeting in the office of the president of the congress, Senator Luiz Vianna Filho, together with other members of the committee, to take cognizance of the secret documents of the Brazilian-German agreement forwarded by Minister Cesar Cals. He explained that the meeting means submission of the congressional investigating committee to the will of the executive.

"An impasse has occurred and I do not accept any imposition at the initiative of the executive power," he observed. He is also prepared not to open proceedings today to listen to the depositions of the current president of the Brazilian Association for the Development of Basic Industry (ABDIB), Waldir Gianetti, and its former president, Claudio Barçella, in the event that the documents requested in June by the congressional investigating committee are not forwarded.

## NUCLEBRAS

In a talk given yesterday at army general headquarters, the president of the Brazilian Nuclear Corporation (NUCLEBRAS), Paulo Nogueira Batista, told the military ministers that the Brazilian nuclear program must be maintained by any means despite some problems pertaining to the time period for training personnel abroad, because he believes that only thus can Brazil emerge from its backwardness in that field. Although the press was not able to attend, some military men present guaranteed that nothing that was said was secret.

The same informants revealed that Batista made a broad review of the policy the country has been adopting in the area, showing how it is being implemented despite the criticism of scientists not connected with the government and part of the press.

According to a government source connected with the sector, the main purpose of the talk was to clarify "continued points of disagreement," because there is concern in certain official areas about what is being publicized about the problem of the continuous jet system to be adopted by Brazil but which is not yet been proved to be effective, not even in Germany. Also a matter of concern is the question of payment for technology and research in addition to the lack of comparative studies between the production of nuclear energy and hydroelectric up to the year 2000, which has not yet been carried out by the Brazilian Electric Power Corporation (ELETROBRAS).

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## BRIEFS

**URANIUM DEPOSITS--**"The latest measurements made at the Itataia uranium reserve in Ceara revealed that it contains more than 50 percent of total known reserves in the rest of the country and it is reasonable to assume as a result of geologic surveys that the neighboring areas may be as rich in ore as the Itataia area." That statement was made by Minister of Mines and Energy Cesar Cals during the Second National Congress on the Northeast held in Anhembi Park. In his talk, the minister stressed the importance of the Northeast in the production of ore and oil, pointing out that of the 24 bores on the mainland in the process of being drilled by the Brazilian Petroleum Corporation (PETROBRAS) at the present time, 21 are in the Northeast. "And the northeastern states, which account for 90 percent of the national production of oil, are responsible for only 13 percent of national expenditures on automotive gasoline," he said. Cesar Cals told the congressmen also that beginning in 1981, Ceara production of oil will reach 14,150 barrels per day, with the entrance into operation of the new Curima and Xareu wells. The minister of mines and energy, who arrived at the congress 2-1/2 hours late, did not want to answer reporters' questions. [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Sep 79 p 6] 8711

**VIABILITY OF NUCLEP--**The Brazilian Government seems to have found a solution to reducing the idle capacity of NUCLEBRAS Heavy Equipment (NUCLEP), a company that has absorbed \$500 million in only 2 years and which will have difficulty in becoming viable. The only opposition to NUCLEP (in its aim to produce equipment and compete in the domestic market with national industry) is the Brazilian Association for the Development of Basic Industry (ABDIB), the same organization that is now being accused of favoring a cartel of national manufacturers. In view of the government's difficulty in making the gigantic factory viable, its intention now in accusing ABDIB is not surprising: to prevent the "cartel," it is better to assign that production to state enterprise, allocating to NUCLEP the production of the equipment heretofore agreed upon with national industry. The Germans will be beneficiaries, naturally, because they are stockholders in NUCLEP and also because, as has been mentioned, the Brazilian Government has assumed a commitment to guarantee NUCLEP's market through an agreement about which all that is known is that it exists and that it is secret. [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Sep 79 p 6] 8711

CSO: 5100

## **LIBERIA**

### **URANIUM DEPOSITS DISCOVERED**

Rangoon THE WORKING PEOPLE'S DAILY in English 29 Sep 79 p 5

[Text] Monrovia, 27 Sep--Uranium deposits have been discovered in Liberia, the Information Ministry's official newspaper reported here today.

The paper NEW LIBERIAN quoted the Chairman of the Foreign Relations Committee of the House of Representatives, Benadict Tolbert.

The report said Tolbert told the chamber on Monday that an American company, Coastal State Gas, which has been given the task of prospection by the Government, intended to give the Government confirmation that uranium had been discovered.

Tolbert, who returned recently from a three-week visit to Europe, was also quoted as saying that a French-Liberian survey backed by the French Government, was to be set up shortly to pinpoint other mineral resources which could be exploited jointly.

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## LONG-TERM URANIUM POTENTIAL HIGHLY PROMISING

Johannesburg SUNDAY TIMES-BUSINESS TIMES in English 16 Sep 79 p 26

[Article by Stephen Orpen]

[Text]

**MIND-BOGGLING** new calculations by the Atomic Energy Board (AEB) suggest that the energy potential of South Africa's uranium could be no less than 900% higher than that of the most optimistic estimates of the country's entire extractable coal reserves.

Speaking to *Business Times* after a seminar for visiting US energy experts, Dr Wynand de Villiers, president of the AEB, said that, using fast-breeder reactors, the energy output available from the country's 500 000 tons of uranium which could be viably recovered, given a market price of \$120 a pound, would be equivalent to that of some 900 000-million tons of coal in terms of electricity generation at current efficiency rates.

Dr De Villiers was at pains to stress that the likelihood of highly capital-intensive fast breeders being introduced in South Africa in the medium-term could be discounted.

Also, the present state of the art — plus the costs and public antipathy in countries like the US to nuclear power

stations — could slow the development and expansion of these plants for commercial use even in the advanced overseas economies.

But the potential nevertheless underlines South Africa's ability to become and remain self-sufficient in the energy sector.

It also lends powerful weight to those who argue not only that the country will become a net exporter of energy in the early eighties, but that it could become an energy leader in world terms before others are able to catch up — and provided geopolitics allow.

Domestically, South Africa is likely to continue to opt for light-water reactors for nuclear power stations if more of these are added round the coast once Koeberg in the Cape is complete.

These are also costly in terms of initial capital spending but less so than fast breeders, and they do not require such advanced technology and fuels.

The cost per kilowatt-hour of electricity from nuclear stations is comparable with that from coal-fired stations, but can be usefully less from fast breeders once allowance has been made for the capital

In light-water reactors, the country's reserves of uranium as defined by Dr De Villiers would be equivalent to a much more modest 13 000-million tons of coal in terms of electricity generating potential.

The country's exploitable coal reserves have been estimated at a conservative 25 200-million tons by official energy planners. The Petrick Commission, using 1972-73 data, put the total reserves at 81 274-million tons to a depth of 500m, of which only 21% could be mined.

A new Chamber of Mines report suggests that at today's prices, and by using modern technology, extractable reserves are around 61 000-million tons.

More optimistic estimates, which assume deeper mining, further advances in extraction technology and higher coal prices, suggest that at least 80 000-million tons are economically extractable.

As for Dr De Villiers' choice of uranium price, several analysts recently predicted that the price was set for a

sizeable near-term hike. They have quoted figures to show that uranium prices have followed oil prices, only about 18 months behind.

Their argument is thus that, by the middle of next year, uranium prices should reflect this year's Opec oil price increases, so giving uranium prices of up to 1325 a pound, compared with the current 900-odd.

There is now a growing caution about such optimism — and especially about the 18-month lag argument.

Yet Dr De Villiers could still be right about the early to mid-eighties price.

On the electricity side, Dr De Villiers thought Eskom's capacity should reach some 65 000 megawatts (currently 15 000-odd) by the late eighties and more than 84 000 megawatts by the year 2 000.

This would mean expenditure by Eskom on new capacity of some R12 000-million by 1985-86 and R20 000-million by the turn of the century.

Eskom general manager Jan Smith is more conservative, however. He reckons on some 23 000 megawatts by 1985 and 30 000 by 1990.

FAULTY FRENCH PARTS FOR KOEBERG PLANT INVESTIGATED

Johannesburg THE STAR in English 25 Sep 79 p 16

[Text] French plans to repair the faulty parts being manufactured for the Koeberg nuclear power station are being examined by South African Atomic Energy Board officials.

The defective parts have already been investigated and remedial action is under consideration, a spokesman for Ecom said today.

"Both Ecom and the Atomic Energy Board were told some time ago of defects during the manufacture of a reactor pressure vessel for Koeberg," said the spokesman.

"The defects, in the parent metal which is covered by a layer of stainless steel, were found by ultrasonic testing techniques.

"The quality assurance organisation of Ecom and the licensing branch of the Atomic Energy Board are being kept fully in-

formed of the remedial work being undertaken," the spokesman said.

He was commenting on reports from France that cracks found in metals in French nuclear reactors — similar to those used in Koeberg — had been found by the firm working on the Koeberg plant.

Dr J W L de Villiers, president of the Atomic Energy Board, said at the weekend that he could not comment on whether the discovery of the cracks would hold up the building of Koeberg.

Nuclear industry union leaders in France said the cracks found in France could lead to a disaster "worse than" the accident at Three Mile Island in America last March.

**FOREIGN MINISTERS SCRUTINIZE EURATOM AGREEMENT**

Zurich NEUE ZUERCHER ZEITUNG in German 20 Sep 79 p 13

[Article by Ww]

[Text] In addition to several questions concerning trade and industrial policy, on Tuesday in Brussels, the EC Council of Foreign Ministers was primarily concerned with revising Chapter VI of the Euratom Agreement, as had been suggested by France. A French memorandum of last June on the subject basically calls for renationalization of the EC's nuclear policy. The council, which is bound by treaty to deal with the thrust from Paris, established a committee of high-level national officials (for example, ambassadors). Their report next January is to serve as a basis for specific recommendations by the commission.

**EC Commission Yields**

The assumption, already being entertained, that the EC Commission is gradually allowing its Euratom trump cards on nuclear policy to be drawn out, has been confirmed in this round of council discussions. Following the commission's approval this summer of the bilateral agreement between Australia and Great Britain to supply uranium, with certain conditions, it has become evident that the commission is no longer prepared to carry out to the letter its role as protector of the Euratom Agreement.

This egg-dance between real EC policy and the steadily growing national interests in nuclear policy had its beginning a long time ago; in fact, it was when the Commission was very accommodating in the application of relevant Euratom provisions. Now it wants to take the logical step and establish clear conditions of competence. Of course, the prerequisites are now such that the national-state interests, which are being massively asserted by France in particular, will probably prevail among the nine EC member countries which are structured differently.

Several ready examples make it clear that these are not just empty words following the council debate that was just concluded. In connection with the

EC's representation at the Vienna negotiations concerning an international agreement on the specific protection of nuclear material, the EC Commission, after several months of a tug-of-war and an unyielding French position, has now determined that in no way can it be a job for the EC to interfere in the specific property protection measures of the individual member countries. It took this clear explanation of the protocol to induce France to relent, so that now the communities can speak with one voice in Vienna, at least in several subareas.

The EC Commission likewise dropped its tarnished principle that only the communities can in fact conclude a uranium agreement with third countries. The plan contained in the British-Australian agreement was expanded and set down at the same time. The EC Commission recognizes the possibility that the EC member countries, in any given case, can reach bilateral agreements with third countries on supplying uranium. In so doing, the authorities in Brussels are yielding in the face of the current political and economic pressure of circumstances.

#### Trade Policy Questions

In the trade policy sector, the EC foreign ministers took up several GATT [General Agreement on Tariffs and Trade] questions, but, of course, as expected, postponed their final judgment of the results of the Tokyo round 1973/1979 until their meeting in October. In agricultural policy the rapid growth of cheap tapioca imports from Thailand for fodder is the occasion for a review of the EC position.

In the second place, the EC Council, upon the initiative of the EC countries which are involved in the construction of the European jumbo aircraft Airbus, mandated exploratory talks with the American government. The Brussels Commission is to probe the response in Washington to its suggestion that advance reciprocal use be made of the sectoral agreement reached in the Tokyo round concerning trade in the civilian aviation sector; this means this year, if at all possible.

#### EC Assistance Code for the Iron and Steel Industries

Finally, the nine foreign ministers, after almost one year of rope tugging, reached an agreement in principle about an EC code of assistance for the iron and steel industries. The formal adoption of the text, which allows broad latitude in regard to how it is interpreted in actual practice, is to be forthcoming in the next few months.

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FEDERAL REPUBLIC OF GERMANY

INDUSTRY GROUP: NO ALTERNATIVE TO NUCLEAR WASTE PLAN

Bonn DIE WELT in German 19 Sep 79 p 9

[Article by Hans-J. Mahnke: "There Is No Alternative to the Disposal Concept of the Government"]

[Text] The political decisions concerning the long-term disposal of waste from nuclear power plants must be made yet this year. As the Federation of Chambers of German Industry and Commerce (DIHT) writes in a comment addressed to the Federal Government, there is no convincing alternative to the integrated concept which entails reprocessing and end storage within the country. The parallel line of attack, according to which it is to be investigated by 1990 whether end storage facilities are to be built with or without reprocessing, is not justified on practical grounds.

"The DIHT supports the disposal concept of the Federal Government," in the words of the comment. For the long term, reprocessing should be secured domestically, not abroad. End storage of spent fuel elements should not be pursued further. From the standpoint of energy and industry policy, as well as from the standpoint of ecology, all advantages lie with the integrated disposal concept. Its realization is a task for the state as a whole, which must no longer be the plaything of party politics and the subject of arguments between the federal and state governments.

"A broad political consensus on all questions of the disposal concept would be desirable. On the other hand, the requirements with regard to such a consensus must not be overtaxed," according to the comment.

In the view of the DIHT, it must suffice if the federal committees of the large parties embrace the disposal concept and help to support it politically. It would be unreasonable to demand that the political consensus includes every state or local association of the parties.

"Here it is, above all, the task of the Federal Government to convince the political parties which support it of the necessity of realizing the disposal concept of the Federal Government and to effect a decision in this regard by the end of 1979." in the words of the DIHT comment.

Foregoing domestic reprocessing would create new forms of dependency with regard to energy policy, the chamber organization warns. In addition, the know-how of German industry with regard to the key technology of nuclear energy would atrophy.

The DIHT regards the construction of interim storage facilities as necessary in order to take precautions for emptying of the compact storage facilities at the power stations that is becoming necessary and thus to avoid gaps in the disposal chain: "Interim storage facilities are no alternative to the disposal concept, but supplement it." In the opinion of the DIHT, the decisions concerning interim storage facilities should be tied to those concerning the disposal concept. It demands the energetic continuation of the plan determination process for the end storage facilities in Gorleben.

If the political decisions concerning reprocessing are not made this year or come out negatively, negotiations with foreign countries would have to get underway at once concerning interstate agreements. However, this would merely be an emergency solution with uncertain result.

To delay the decision until 1990 could mean not only the loss of the option of domestic reprocessing. "In view of the position of the administrative courts with regard to the juncture between expansion of nuclear energy and the securing of disposal, a continuing prohibition of construction of further nuclear power stations in the FRG must be anticipated," the DIHT warns.

Nuclear energy thus could not fulfill the tasks within the framework of the energy program of the Federal Government as intended. For this eventuality the serious consequences in regard to energy supply should be presented openly.

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FEDERAL REPUBLIC OF GERMANY

NUCLEAR CONSTRUCTION HALT THREATENS JOBS, TECHNOLOGY LOSS

Bonn DEUTSCHE ZEITUNG in German 14 Sep 79 p 24

[Article by Hans Pfrema: "Five Minutes to Twelve: Concern for Jobs and German Technology"]

[Text] In the FRG, nuclear energy is already supplying 14 percent of the electricity, but expansion is stagnating.

They are working—in spite of protests by environmentalists and spectacularly announced closings and halts—but they are working in obscurity. Nevertheless, they are making a contribution to the German energy supply that can no longer be ignored. During the first 6 months of 1979, German nuclear-power plants produced 21.6 billion kilowatt-hours and for the first time contributed more than 14 percent to the electricity produced in Germany. And it was accomplished in spite of the fact that the KKW—an abbreviation used within the industry for the word Kernkraftwerk [nuclear energy plant]—Brunsbuttel is still shut down and in spite of the fact that the nuclear installation in Niederaichbach in Lower Bavaria is supposed to be torn down at a cost of DM 80 million; it was in operation for only 5 days when it was shut down 4 and 1/2 years ago.

Nevertheless, the impressive figures of success should not be deceptive; the world of nuclear energy in Germany—in contrast to, maybe, France and the East bloc countries—has been out of sorts for a long time. "With respect to the energy situation it is 5 minutes to 12," is the warning by Barthelt, chairman of the board of Kraftwerk Union (KWU), a subsidiary of Siemens and the largest German producer of energy plants.

To be sure, Barthelt is partial, but, at least, it should be remembered that the German nuclear-energy industry with its technical and economic potential is gradually being cut off from the development beyond its borders. German energy-plant producers have not received a single domestic order for a nuclear-power plant since 1973, and since 1977 there have been no orders from abroad either, although before that time orders were plentiful. The reason: A country that has no confidence in its own nuclear-energy technology.

A good example of this is Sweden. When the Social Democrats were replaced after governing for decades, nuclear-power plants were also placed on the red list and the production of domestic nuclear-power plants came to a halt. Since then Sweden has disappeared from the world market as a supplier of nuclear technology.

German producers of energy plants are afraid that their own industry will experience a similar fate—which will also affect the domestic labor force involved with nuclear energy. Barthelt estimates that if the low in orders for German nuclear energy producers persists, 130,000 to 150,000 jobs will be at stake. Wolfram Thiele of the GHH Concern and Barthelt's colleague puts it more precisely: Until the turn of the year 1979/80 the nuclear industry may be faced with the lay-off of 1,000 highly qualified workers—"unless there is a miracle at the last minute."

Nuclear-power technologists hope that this miracle will come from the FRG government and the licensing authority as well as the courts. They are appealing to Bonn to tackle the storage problem as quickly as possible and as effectively as necessary. Not until there are sufficient interim storage facilities, will federal courts consider the storage of fuels for new nuclear-power plants as safe and revoke the current blockade of new projects. In this respect, energy-plant operators are also placing their hope abroad: There they may be able to find and create additional storage capacities for German fuel waste. Klaus Knizia, chairman of the board of the United Electricity Works of Westfalen (VEW), which is the second largest supplier of electricity in the Ruhr area, RWE [Rhine-Westphalian Electricity Works] is the largest, made the following statement: "At the present time, the least that is required is the creation of interim storage capacities until a proper storage facility can be constructed without interference and with the approval of the citizens."

As a matter of fact, in public discussions there is currently more emphasis on the storage problem than the possibility of an accident like the one in Harrisburg. Since Ernst Albrecht, minister president of Lower Saxony, stopped the Gorleben project for lack of political support, Germany's Land executives have been passing around the storage requirement like a hot potato, irregardless of their political-party affiliations.

Since aversions to nuclear-power plants are much less pronounced outside the FRG, nuclear installations continue to be erected beyond the borders. Knizia hopes: Since these new nuclear-power plants require storage facilities anyway, the possibility exists that Germany's fuel could be stored there on an interim basis and be made ready for use at a later date. But there is one distinct shortcoming: German expertise and German experts would then no longer be part of it.

Nuclear-power plant producers are also in disagreement with the widely held view that only a few large enterprises would be affected by the forced halt to construction and the shutdown of technology. Up to 700 enterprises are involved in the construction of one nuclear-power plant. Approximately 500 of them employ fewer than 200 workers. It is here, according to power-plant producers, "where the know-how chain can be broken already much earlier" than is the case with large enterprises.

As a consequence, nuclear-power plant producers are envisioning a long-term plan of restructuring the German energy market. In view of the explosive increases in the price of the major energy source, oil, more coal must be used in the future replacing oil. And continuing the chain of substitution, nuclear energy could take the place of coal—especially where coal is burned to produce electric energy.

Nevertheless, if the blockade of nuclear energy continues, Knizia fears that in the year 2000 there will be a shortage of 150 to 200 million tons in the supply of hard coal units. It would be approximately one-third of the world production of hard coal expected for the next 20 years.

Nuclear-energy enterprises are concerned about jobs—an aspect which is frequently ignored during emotional discussions about nuclear energy—as well as the preservation of a highly developed technology. One will have to write off the know-how and the high degree of maturity of German nuclear-power plants which has already been achieved, unless by the end of the year 1979 there is a decisive turnaround in domestic nuclear-energy politics. As a consequence, "scientific potential" will also be "destroyed."

Klaus Barthelt of the KWU solidifies these fears: "Human capabilities of planning complex facilities like nuclear-power plants or their large components and producing them cannot simply be put on ice. Not long periods of inactivity, but the abilities of people and their working together on a daily basis is living science or know-how."

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## NEXT FINNISH-SOVIET REACTOR MAY CONTAIN MORE FINNISH COMPONENTS

Helsinki HELSINGIN SANOMAT in Finnish 11 Sep 79 p 17

[Commentary by Hannu Olkinuora]

[Text] The Imatra Power Company (IVO) is losing 200,000 marks a day due to delays in the completion of Loviisa's second nuclear power plant. The hair fissures that appeared on the reactor's pressure vessel during the lining process are still being examined and the company has no intention of applying for a permit to charge the reactor before the reason for the cracks has been determined and they are repaired. The company has already lost over 80 million marks.

The final deadline for delays agreed on between the power plant's Soviet supplier and the IVO was a couple of months ago and now the buyer is responsible for any losses incurred by delays. However, the seller pays for the replacement of any defective parts.

A delay of over a year from the time originally scheduled for the completion of Loviisa's second 440-Mw power plant has not changed the IVO's plans to acquire a third nuclear power plant from the Soviet Union. A big 1,000-Mw plant is included in the 15-year agreement between Finland and the Soviet Union. The transaction has not yet been discussed and, according to Finnish energy predictions, it will be ordered at the earliest in 1982.

Nevertheless, the IVO will begin preliminary work on setting in motion the general planning of the plant along with the seller as early as this year.

Having learned from the experience of the first two Loviisa plants, the IVO will attempt to make the new reactor "more Finnish" than the others. Domestic participation in Loviisa's first two plants amounts to 70 percent and they intend to bring that up to 80 percent in the new one.

Among other items, they are trying to get valves and piping manufactured in Finland. They are attempting to adapt the operations performed on the job-site that has been shifted to Loviisa to Finnish factory conditions. The IVO asserts that during inspections the number of parts to be replaced is not exactly recorded but "there are more precision machine parts than others."

"If we are not satisfied with some part, we do not accept it," IVO general manager Pentti Alajoki said.

Alajoki noted that the requisition agreement specifically provides that the plant meet Finnish demands.

#### Soviet Plants Able to Compete

In general manager Alajoki's opinion, there are no particular reasons why the next plant should not be ordered from the Soviet Union. "They are fully able to compete, technically and price-wise. In addition, the degree of domestic participation is high and we can ship used fuel back to the Soviets.

"In any event, the final decision on ordering the plant will be made by the Council of State. With us, nuclear power plants have always been political affairs," Alajoki said.

IVO manager Kalevi Numminen maintained that it is hard to talk with the Soviet Union about any other size power plant because the 1,000-Mw model is their mass-production type. The first plant of this size will be completed there next year. To be sure, several are already under construction.

The location of the new plant in Finland is still an open question. "We have sites in Loviisa and Olkiluoto and Jönköping too is to be considered."

#### Cost Risen Twofold

To date, completion of Loviisa's second plant has already been delayed by over 400 days. Also, the cost of the plant has risen from the 500-million-mark figure set at the time it was ordered in 1969 to twice that amount, due to increases in construction costs, among other reasons. The latest cause for delay, a defective pressure vessel, has already delayed completion of the plant by 2 months. Behind-schedule equipment deliveries have delayed construction operations before. Small cracks had already been noticed in the pressure vessel, the biggest part the Soviet Union has delivered to the plant, at the factory in Izora. They are in the welded stainless steel lining that serves to protect the vessel's inner surface.

"Our men took very little notice of them and they were superficial. According to the statements of experts at that time, these cracks would not interfere with operation and we let the vessel be brought to Finland," manager Kalevi Numminen explained.

"Laboring under a test load at Loviisa, additional defects were found in the vessel. We were, however, able to confirm the fact that all the cracks had been there from the start. The heavy load and more sensitive testing devices were merely better able to reveal them."

Muuminen noted that the occurrence in question is a familiar one in other countries as well. These so-called hot cracks appear during cooling of the welded layers. Stainless steel is welded in 25-cm seams consisting of three 3-cm-thick layers to protect the vessel.

"The fissures are not in the solid parts of the vessel and they are absolutely harmless if they do not spread.

"But now we want to gain control over the situation. Soviet researchers are investigating the matter with the IVO and the State Technical Research Institute in an attempt to discover the nature of the cracks by comparing them with those encountered elsewhere in the world, among other things," Muuminen informed us.

General manager Pentti Alajoki noted that discussions with the Soviet supplier brought on by the delay in completion of the Loviisa plant have been moving along "even better than would have been the case with others."

"In construction work, such major objects of interest always give rise to discussion," the IVO general manager said.

In major power plant contracts, according to general practice, the seller is responsible for delays amounting to a week's damages up to a certain point. In the case of Loviisa's second plant, that point has now been exceeded and the loss has to be assumed by the IVO, a state concern.

The IVO's losses are attributable to the fact that it is not getting any income from the sale of electricity. However, there is no shortage of electricity because there are power plants elsewhere, but they have to import expensive fuel for use in such plants. In coal-fueled plants, fuel accounts for about 10 pennia per kilowatt hour, whereas atomic power costs only 3-4 pennia. Furthermore, large amounts of capital are invested in nuclear power plants.

"We knew when we ordered them that such plants involve delays of about a year and we were able to prepare ourselves for them. Just how much so is a secret, since it involves power rates.

"Right now, we believe we will get the plant into temporary operation before the end of the year. We can go into full operation later, since setting the plant in motion is accomplished gradually."

Alajoki and Muuminen expressed optimistic opinions on the start of troubleshooting operations. "We believe that we can repair the 'bucket'."

### TVO Also Suffers Losses Due to Delay

Completion of Finland's other nuclear power company's, the private Industrial Power Company (TVO), Olkiluoto nuclear power plants has also been delayed due to construction difficulties. Completion of Olkiluoto's first plant has already been postponed far beyond the originally planned deadline, at first due to a fire and then to various defects that showed up in the equipment. The latest one, a break in a pipe that happened nearly 2 weeks ago, has kept the plant from finally going into operation.

The two plants supplied by the Swedish firm, Asea-Atom, are to go into operation at about the same time. Olkiluoto's second plant has stuck close to schedule and it will be charged right on time.

Delay encountered with Olkiluoto's first plant has already cost the TVO over 70 million marks in lost income. Both reactors are rated at 660 Mw.

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LOVIISA I ATOMIC PLANT COOLING SYSTEM FEARED INADEQUATE

Helsinki HUFVUDSTADSBLADET in Swedish 12 Sep 79 pp 1, 18

[Commentary by Bjorn Sundell: "Is Loviisa Nuclear Powerplant Less Safe Than Expected?"]

[Text] It is possible that the nuclear powerplant Loviisa will be forced to shut down next week in order to improve the effectiveness of the cooling system. The Harrisburg accident in the United States has led to new investigations into the safety of the nuclear powerplant--the latest of which was made by the National Center for Technical Investigation. Present investigations are concentrated on the effects of leaks in the cooling system.

Imatran Voima, owner of the Loviisa nuclear powerplant, has been given just 1 week to prove that the reactor's emergency cooling system is capable of preventing the risk of overheating and radioactive leakage in the event the primary cooling system should fail. In the absence of adequate proof, the plant could face a temporary shut-down.

The Radioactive Safety Institute will make the final decision as to whether the plant can continue to operate. Some time ago the institute ordered the National Center for Technical Investigation to study the risks connected with medium-sized leaks in the cooling system. An intermediate report has now been made available. At worst, a leak in the primary cooling system could cause the temperature to rise to 750 degrees in the fuel rods' protective covering (see chart). The danger limit is considered to be 800 degrees. Should the fuel rods be exposed to this temperature for an extended period of time, the protective covering could crack and thus allow radioactive water to escape into the primary area and, by a leak in the primary cooling system, into the encapsulated reactor building.

It is not a question of a major catastrophe. The reactor is encased in a steel shell and the temperature in the reactor cannot rise high enough to harm the steel shell.



"In this case everything is a matter of theory. With the aid of a computer, the National Center for Technical Investigation has tried to determine the effects of a leak in the cooling system. As of yet, there is no proof that the temperature can actually rise to 750 degrees," according to Chief Inspector Jukka Laaksonen with the Radioactive Safety Institute.

"The probability seems rather slim and thus Imatran Voima still has time to prove there are no risks connected with a leak in the primary cooling system. One must be able to prove one is master of the powerplant in all situations. If conditions still seem unsafe by Monday, the powerplant will have to shut down for inspection.

In theory an eventual accident could occur in the following manner:

A leak develops in the pipe through which the cooling water is pumped into the reactor. The cooling process continues with the aid of the emergency cooling system. Due to the leak, steam develops in the reactor and escapes into the reactor building. This steam must be ejected from the reactor itself in order to make room for the cooling water. But, since some of the pipes are bent, there is a risk that so-called water blocks may develop in these bends, which, in turn, would prevent the steam from escaping through the crack in the pipe. This could adversely affect the cooling process.

Under these conditions, the temperature could rise to 750 degrees in the fuel rods' protective covering and crack the covering. This means the steam and cooling water that escape into the reactor would be radioactive.

Now the problem is the accumulation of steam. Can the steam be diverted from the cooling system to make the emergency system function or could a situation develop in which the steam might actually obstruct the flow of the cooling water?

There is nothing new about leaks in the primary cooling system and these have been investigated before. The investigation which is now being conducted by the National Center for Technical Investigation will probe more deeply into the effects of a leak of that sort and its influence on the temperature in the reactor.

According to technologist Bjarne Ragnell with Imatran Voima, the IVO (Imatra Power Company) as well as the Russian reactor supplier have investigated the risks connected with cracked pipes for some time.

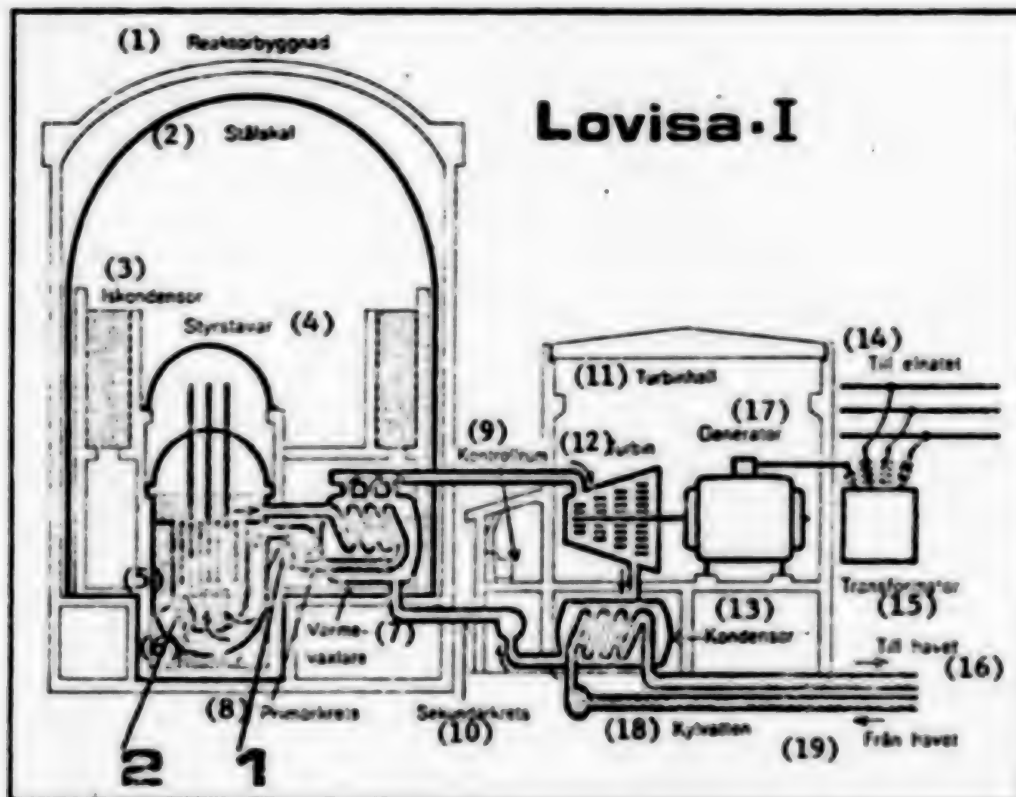
According to Ragnell, results of the investigations show that the reactor meets the necessary safety requirements.

"Since the Harrisburg accident there has been a growing interest in small cracks in the reactor pipes," said Bjarne Ragnell. "Investigations will be intensified now, but my opinion is that the emergency cooling system can handle the leaks now in question.

"The maximum temperature allowed in connection with a nuclear reactor accident is 1,200 degrees, but there is always a question of time as well as temperature. The effects of a leak depend upon how long the reactor is exposed to a certain temperature. In order for the rod covering to develop cracks at 800 degrees, the temperature must be retained at this level for a longer period of time, which is unlikely.

"But, since the risk clearly exists, investigations will be continued in cooperation with the Russian supplier."

And on Monday we will have the decision as to whether the plant will be shut down for a while.



The latest investigation concerns leaks that develop in the primary cooling area between the pump and the reactor (arrow 1). These leaks could raise the temperature in the fuel rods' protective covering (arrow 2) to 750 degrees. The high temperature could cause cracks and radioactive leakage within the reactor building.

**Key:**

- |                      |                       |                             |
|----------------------|-----------------------|-----------------------------|
| 1. Reactor container | 7. Heat Exchanger     | 13. Condensor               |
| 2. Steel shell       | 8. Primary circuit    | 14. To the electric network |
| 3. Ice condensor     | 9. Control room       | 15. Transformer             |
| 4. Control rods      | 10. Secondary circuit | 16. To the sea              |
| 5. Uranium           | 11. Turbine Hall      | 17. Generator               |
| 6. Reactor           | 12. Turbine           | 18. Cooling water           |
|                      |                       | 19. From the sea            |

## FRANCE

### NOGENT NUCLEAR POWER PLANT CONSTRUCTION DISCUSSED

Paris LE FIGARO in French 6 Sep 79 p 11

[Article by Maurice Cazaux: "The Nogent-sur-Seine Nuclear Power Plant"]

[Text] Unlike the Aube reservoir dam project for which two prefects instituted a public inquiry of unusual scope, no comparable procedure is planned in connection with the construction of the nuclear power plant at Nogent-sur-Seine (Aube). But Justice Minister Alain Peyrefitte, mayor of Provins, did recently organize a meeting designed to provide maximum information and reassurance to the local population.

Minister of Industry Andre Giraud recently answered, in the JOURNAL OFFICIEL, a question posed by Joseph Franceschi, socialist member of parliament from Alfortville. Giraud explained how the Nogent nuclear power plant was absolutely necessary by pointing out that the Department of Aube was situated at the intersection of two regions, Champagne-Ardenne and Ile-de-France, which currently have a shortage of electric power. The sole power generating center in the Champagne-Ardenne region is in Chooz where there is a nuclear power plant whose output is shared between Belgium and France. Because of the mainly agricultural character of activities in this region, its electric power requirements are expected to increase some 6 to 9 percent per year in the course of the next decade. This is above the national average which is 6 percent.

In the Ile-de-France region, there is a more pronounced industrial presence. The increase in consumption there will be of the same order of magnitude as the national average, then will stabilize at a slightly lower level. But there is a probability that electricity consumption for the two regions combined will more than double between now and 1990.

Now the Ile-de-France region has only conventional thermal (steam-electric power plants around the greater Paris area. Last year, these plants generated approximately 25 billion kilowatt-hours. Yet this output will decrease in the next few years because of the dismantling of some of these power plants.

These considerations explain why the government--after consultation with representatives of the local communes and departments--approved the Nogent-sur-Seine site for installation of a power plant consisting of two reactors with a rated output of 1.3 billion watts.

The Nogent site offered the most favorable characteristics: a subsurface providing a stable and solid foundation capable of accommodating heavy structures, proximity of the Seine River the flow of which can supply the plant the water it needs year-round without restricting users downstream from the site, and lastly, the very short connection required to the electric power transmission grid. The EDF [French Electric Power Company] was, therefore, authorized to file an application for a public interest statement. This application was supported by, inter alia, an environmental impact study indicating all of the measures taken to offset any possible damaging effects of the construction work.

The procedure followed was in conformity with the provisions of current laws and regulations. Public hearings were held in all of the communes within a 5-kilometer radius of the proposed site.

Moreover, to permit any person who might feel concerned to express his views, the widest possible advance publicity was given to each hearing. The application and supporting documents were filed in the chief towns of the departments and administrative districts concerned.

The meeting organized by Alain Peyrefitte, the third of its kind, was held in the Provins subprefecture. Officials present included Robert Galley, the minister of cooperation and mayor of Troyes, and Messrs Brachard, prefect of Seine-et-Marne, Marchand, prefect of Aube, Breuil, subprefect of Provins, Duvernay, a member of parliament, Boiteux, president of the EDF, and Lerebour, director of the autonomous port of Paris.

These officials deplored the excesses of an antinuclear campaign they deemed to be extremely biased.

It was agreed that all necessary information should be furnished local populations, particularly by the EDF. Lastly, it was considered highly desirable to have the communes adjacent to the Nogent power plant draw maximum material, economic, and financial benefits from this project.

8041

CSO: 5100

FRANCE

BRIEFS

REACTOR PARTS REPAIRED--The parts for the Osirak nuclear reactor, damaged during a [sabotage] attempt at La Seyne in April, have now been repaired and will be sent on to Iraq. [Text] [Paris LE POINT in French 15 Oct 79 p 71]

CSO: 5100



CDA SPLIT ON NATO, NUCLEAR WEAPONS PROBLEMS

Rotterdam NRC HANDELSBLAD in Dutch 11 Oct 79 p 3

[Article by J.M. Bik: "Irritation Within CDA Because of Nuclear Weapons"]

[Text] The Hague, 11 October -- It looks as if officially the Netherlands has moved a little closer to agreeing with an upcoming NATO decision in principle, to be made next December, to modernize tactical nuclear weapons in the so-called gray area while simultaneously offering to negotiate with the Soviet Union about these weapons. This could be inferred from an answer given by Prime Minister Van Agt yesterday evening during the general debate on questions which were raised in the House concerning this matter; the answer also led to considerable irritation within the left wing of the CDA [Christian Democratic Appeal] parliamentary party and among the opposition.

Two problems were involved yesterday evening with regard to this complicated issue:

- the question of whether 2 months from now NATO could make a decision to modernize if at that time the controversial SALT II treaty between the United States and the Soviet Union (limitation of strategic nuclear arms) has not yet been ratified by the American Senate;
- the interpretation of the Van der Stoep/De Boer/Brinkhorst (PvdA [Labor Party]/CDA/D'66 [Democrats '66]) motion which was agreed on last spring.

The PvdA, possibly also the D'66, and the left wing of the CDA parliamentary party believe that at the time the House passed the motion, it expressed its view that NATO should temporarily give up on a decision in principle to produce its own new gray area weapons (Pershing II and cruise missiles) and should first quickly enter into negotiations (in SALT III) with the Soviet Union concerning such weapons (on the Russian side, among others, the SS-20 and the Backfire). However, this intention was not specifically mentioned in the motion. The government chose another interpretation, which was introduced Tuesday by CDA parliamentary party leader Lubbers.

Speaking about the Van der Stoel motion, Van Agt said: "That motion confirms the primacy of arms control and, I repeat, this is central to the administration's policy. But, in our opinion, this motion did not obligate us to an approach whereby a decision to modernize cannot be made pending the results of arms control negotiations. I believe that Messrs Lubbers and Rietkerk have pointed out -- and rightly so -- that negotiations can only function on a basis of mutual strength."

Van Agt stressed, especially in answer to critical questions from the parliamentary parties of the CDA and of the opposition parties, that the goal of reducing dependency on nuclear weapons is important. Therefore, as was reported earlier, the Dutch members of the official NATO study groups have successfully insisted that in case such a decision to modernize is made next December (via Pershing II and cruise missiles), the number of nuclear warheads in Western Europe will not be increased. Nor will the Netherlands during the next few weeks limit itself to an "isolated handling of the SS-20 problem" (the new Russian medium range missiles, directed among other things to Western Europe) in the NATO negotiations, said the prime minister, specifically addressing the PvdA.

Van Agt cited with approval CDA leader Lubbers: "What is important now is to prevent a split between America and Europe within NATO." The Netherlands does not intend to take up an isolated position in NATO with regard to the modernization of weapons. A reduction of dependence on (still indispensable) nuclear weapons "can only be achieved in close negotiation and cooperation with the allies, based on reciprocity with the Soviet Union and the Warsaw Pact countries."

The fact that the government, like its NATO partners, is steering toward a NATO decision in principle to modernize and wants to initiate (push) a discussion of the implementation of such a decision, became apparent when Mr Van Agt said: "(...) The modernization program which will eventually be decided on, will have to be adjusted in the light of the results of the arms limitation negotiations which are to be held. In view of the lapse of time between a decision on the principle and the actual implementation of new weapons systems by the allies, this is a real possibility."

This plan proceeds from the assumption that a decision in principle to modernize cannot be carried out before 1983 in any case (for the time being, the introduction of the type of cruise missiles which are being contemplated -- with a range beyond 600 kilometers -- is prohibited by the protocol to SALT II), so that -- unless the Soviet Union is willing to make concessions in the gray area -- later on the introduction of such NATO weapons could be completely or partially abandoned.

#### Course Change

"This is nothing less than the formula of the German SPD [Social Democratic Party of Germany]," was the complaint heard yesterday evening within the left wing of the CDA parliamentary party. They were also gloomy about

whether they could still succeed today in convincing first parliamentary party leader Lubbers and then the cabinet, to change their course in favor of a NATO offer of negotiation without a decision to modernize. "It looks as if we are largely losing this battle, even though we are not giving up yet," said a parliamentary party member.

As for the connection between the SALT II ratification and the NATO decision to modernize, Prime Minister Van Agt acknowledged that such a connection does exist. "In concrete terms, this means that the Dutch government will not commit itself unconditionally if the fate of SALT II is not certain," he said.

#### Statement

This was not going far enough for the opposition. Consequently, Den Uyl asked the prime minister to make a statement to the effect that the Dutch government will not participate in any NATO decision to modernize as long as it is not known what is going to happen with SALT II. Van Agt declined to consider this. It was said later that the PvdA parliamentary party plans to ask the House today to make a decision on this. This would put the CDA parliamentary party in a very difficult position, because a majority of its members also believe that SALT II must be taken care of first if a balanced NATO decision concerning modernization and/or negotiations with the Soviet Union are to be possible, but it does not want to fall away from the cabinet either. Today or during the next few weeks, Lubbers should prepare his own CDA motion rather than try to bring the cabinet around to another position on this matter.

#### Text of House Motion

Among other things, the Van der Stoep/J. de Boer/Brinkhorst motion -- which the House passed last February -- expressed its endorsement of President Carter's policy with regard to SALT II, and requested that during the NATO negotiations on nuclear weapons the government strive primarily to attain the following goals.

- . The continuation of the offer to reduce American nuclear resources in Europe in exchange for a reduction of the number of Russian tanks, which was made within the framework of the MBFR [Mutual and Balanced Force Reductions] negotiations.

- . The rejection of such changes in the weapons systems which are present in Europe, that would increase the danger of an early use of nuclear weapons in a possible armed conflict.

- . The opening, as soon as possible following ratification of the SALT II agreement, of SALT III negotiations whereby an attempt, based on the overall balance of nuclear combat forces, primarily of the United States and the Soviet Union, will be made to prevent a nuclear arms race in Europe and to reduce the role of nuclear weapons in Europe.

NUCLEAR POWER: PROS, CONS DEBATED

Lisbon DIARIO DE NOTICIAS in Portuguese 15 Sep 79 pp 29, 30

[Unattributed article: "Are Nuclear Power Plants Indispensable?"]

[Text] Marques Videira, ministry of industry; Almeida Fernandes, assistant secretary of state for urban development and environment; Faria Ferreira, director-general of water power resources and projects; Frederico Carvalho, researcher, Nuclear Physics and Engineering Laboratory reply to the survey by DIARIO DE NOTICIAS on the problem complex of the nuclear power plant. This is a highly controversial issue which the Guadiana "case" brought to the front pages of our newspaper. 1. What in reality are the main damages which the construction of the nuclear power plant on the Guadiana bring for Portugal? 2. What is the best way to fight the dangers and inconveniences resulting from the construction of nuclear power plants? 3. Do you believe that nuclear power plants are indispensable or do you think that the other existing alternatives as a whole satisfy Portugal's current and future energy requirements?

Nuclear energy sprang up as an alternative for the eighties to compensate for petroleum, (or electric energy obtained in conventional power plants, and, in some cases, for the "fuel-oil" which is presently used as fuel in thermal power plants.

From the viewpoint of its defenders—who stress the need for developing fast solutions to the energy crisis—the nuclear option is not a purely economic or thermal solution. It also presupposes a decision as to the type of society we want to have by the end of this century: Are we going to continue to burn the remaining petroleum and coal reserves or are we going to adopt realistic and convincing energy techniques which enable us to plan in more long-range terms? But the very same people who have no doubt in answering this question do not fail to point out



that the nuclear option must be fully aware of the ecological risks it entails, arguing however that the ecological risk of burning petroleum or coal likewise must not be underestimated and that nobody has so far managed to offer a realistic alternative to nuclear energy.

On the other side of the balance sheet we have the 2,500 accidents that took place not only in 1978, in the 72 American reactors, the most spectacular of which was at Three Mile Island, whose causal analysis made it possible to establish that "there were serious instrumentation errors" (which could be behind the "inexplicable" accident in Pennsylvania) in 71 out of the 72 American power plants but also in all of those which the three manufacturers export (Westinghouse, General Electric, and Babcock Wilcox). The Spanish power plants are American-made and it was learned that four of those power plants were closed for inspection at least in Japan and Sweden.

We must also remember the bitter debate that sprang up recently in connection with the plans for the construction of a nuclear power plant at Valdecaballeros, in the Badajoz Region, close to the Portuguese border. The information given in the course of a conference on the Spanish Estremadura nuclear power plants project revealed, especially with regard to the flow rate of the Guadiana, that—according to the persons participating in the conference—that figure will be reduced to one-half during normal times and it will be dry during droughts, that is to say, above and beyond a heat generation volume on the order of 30 trillion calories per year which will produce considerable water evaporation with a subsequent rise in the total humidity and a temperature increase—factors which will certainly cause climatological variations and which will put a burden on the ecological equilibrium.

In the meantime we are not taking too much of a chance in assuming that any delay or interruption in production at nuclear power plants will force a speedup in the construction of liquid-fuel power plants in the most developed countries—something which those countries do not seem inclined to accept easily in view of the combination of energy and economic crises.

This highly controversial issue thus is the topic for a survey by DIARIO DE NOTICIAS. We got our responses from industry minister Marques Videira; assistant secretary of state for urban development and environment, Almeida Fernandes; Faria Ferreira, director-general of water power resources and projects; and Frederico Carvalho, researcher, Nuclear Physics and Engineering Laboratory.

Marques Videira (Industry Minister): "Northwhile Solution for Portugal, Supported and Recommended by EEC"

1. If current practices in the planning, design, and operation of power plants were to be implemented and if the usual regulations and requirements are properly complied with, then there would be no reason to anticipate any



negative effects as far as the environment or the health of the people are concerned, that is, effects that would be caused by the routine operation of these facilities.

Given the distance between Portugal's border and the location of the two units scheduled for Valdecaballeros, the only potential impact channel would be through river water contamination. Current technologies, without any special requirements, enables us to obtain liquid effluents with so little contamination that, even under the worst conditions in the Guadiana River flow rate, the concentrations of radioactive products would not exceed a very small fraction of the maximum concentrations acceptable in drinking water and required in domestic legislation which, by the way, follows international recommendations.

It is to be hoped from the Spanish authorities that they will strictly require boundary concentrations in the power plant's discharge canal, almost 200 kilometers upstream from the international section, which would make it possible already to use the river water there without restriction.

Only in case of a very serious accident at the power plant is there reason to fear a potential temporary impact with any significance on Portuguese territory. These situations however are being studied so that they would have the very lowest possible probability; but, no matter how good preventive techniques are, it is necessary to be prepared to cope with such situations, correct them, and to repair their consequences, safeguarding all of the domestic interests involved.

The establishment of formal consultation and information exchange mechanisms between Portuguese and Spanish authorities responsible for the licensing and inspection of these installations will enable us to obtain a guarantee and clearly to demonstrate that adequate measures are being put into practice, that we objectively determine and report, at the proper time and with efficient detail, the characteristics that are of concern in these installations and their operation as well as the triggering of emergency measures in case of accidents. Contacts are now underway and an agreement is to be signed with the Spanish government along these lines.

2. Nuclear technology is based on industrially proven engineering techniques; only those innovations are introduced which have been extensively tested and they are always the source of unforeseen developments. On the other hand, it has been based on strict compliance with safety rules and on high-grade inspection and guarantee requirements, applied from the most preliminary design stages onward—something which rarely is found to have its equivalent in any other activities. It is necessary to guarantee the continuation of the application of these principles.

The dominant attitude is "preventive" and the safety and protection requirements are an integral and decisive part of the entire project and are initiated through the meticulous and extensive study of site location

conditions in order to reduce any impact to insignificant value. Wide safety margins are adopted in design and surveillance, control, protection, and assistance means are greatly increased in number to guarantee sufficient redundancy of equipment and to eliminate the possibility of damage. Potential external "aggressions" are being studied and that includes earthquakes, storms, etc., with such intensity that their probability of occurrence is very low although the power plant structures are designed to withstand them.

Another decisive factor is the judicious selection of maintenance and operating crews, their training, as well as their careful basic and refresher training and periodic examinations under real standard operating conditions and in simulators for accidental conditions for abnormal situations.

To make sure that all this is being done in connection with each project, the information obtained in the course of operation is constantly updated in the light of the development of the latest knowledge and experiences; in this way the government gets further background information for gradual licensing procedures which involve a review of the entire project as well as the inspection of the components manufacturing establishment and the construction and operation of the power plant by specialized technicians who permanently update their knowledge of technology and who are independent of those who are responsible for the entire operation and who are free of any worries about practical implementation of the various measures concerned and their costs.

The ministry of industry is about to institute and promote adequate practical training for this body of engineers in keeping with international recommendations in this matter.

3. With the exception of Turkey, Portugal is the European country with the lowest per-capita electric energy consumption. This consumption is about one-tenth of the figure in Sweden, one-quarter of Belgium, the United Kingdom, and West Germany, one-third of France, and half of Italy and Spain.

Energy generation is intimately tied to the development levels of the various countries and to the quality of life of the populations involved. If we want to raise the living standard of the Portuguese people and if we want to move closer to the European countries in terms of economic and social conditions then we will implicitly have to move on toward greater energy consumption.

The country's electric energy supply so far has been provided primarily through our water power resources and the import of petroleum. As for the latter, everybody knows what has happened in terms of the price rise on top of which we have uncertainty as to the guarantee of this flow of supplies and just exactly how much petroleum is really available in the first place. These factors have caused trouble worldwide and, consequently, also

domestically, reducing the interest in the utilization of that fuel for the purpose of generating electric energy.

Thus we detect a tendency toward the utilization of petroleum derivatives for some of the higher-level operations, replacing fuel with coal and with nuclear energy in electric energy generation to meet increasing consumption requirements.

In the Portuguese case likewise we cannot escape this general development trend and, over the next several decades, we will barely have enough water power energy reserves, such as they are left to us, plus the coal we are going to have to import, since our reserves are very small—and, of course, we are also going to have nuclear energy.

However, the country's still available water power resources are far from capable of meeting our additional requirements and besides, most of them are more geared toward meeting peak consumption requirements.

So-called renewable energy sources might possibly make some contribution to the country's energy supply through the production of heat, and, very sporadically and in isolated cases, to very low-power electric energy supply. We do not expect that they will be able to make any significant contribution to electric energy generation by the end of this century. The technology involved in these energy sources is not sufficiently developed to permit their production under acceptable economic conditions.

Thus, by the end of this century, increases in the thermal component of the national electric power production system will have to be handled essentially by coal or nuclear power plants.

An option between these two energy producing sources is a very complicated thing. Although it may be practicable to compare the two energy sources in investment terms only, this will no longer hold water when we want to compare these undertakings in terms of their lifetime since we cannot predict the development of fuel costs involved. Thus, price rises similar to those we had in petroleum might materialize in the case of uranium and coal.

Regarding the fuel supply aspect and, specifically, regarding guaranteed supplies, using coal alone would introduce some rather preoccupying aspects. The current main supply sources, with the exception of Poland, are in areas far away from Portugal—the United States, South Africa, and Australia—and this implies the employment of a rather big fleet of bulk carriers.

It is important to note here that an electric power plant burning coal and having the capacity of the Setubal Thermal Power Plant, which is 1,000 Megawatts—each year requires about 2.5 million tons of coal and that means about 7,000 ton- per day or one 30,000-ton bulk carrier every four or five days. According to the anticipated development of Portugal over the next

several years, it is to be expected that, by the start of the decade of the nineties, we will be putting up energy production centers giving us a total of 2,000 Megawatts, using coal, which represents about 14,000 tons per day and that in turn means that we must have the proper port facilities and the proper fleet of vessels.

For a country such as Portugal, coal thus is an energy source that demands the creation of major port facilities, particularly those relating to transport and handling. In addition to that, it involves an extensive series of services connected with its supply which is highly vulnerable to world conflicts of a political and social nature. The same is not true of nuclear energy production since this kind of power plant is supplied only once a year and since the quantities of fuel to be handled are small, in other words, for an 1,000-Megawatt power plant that would be something like several tens of tons.

In addition to that, looking at Portugal as such, they present the advantage of constituting a diversification of energy sources and they can give us a better energy supply guarantee due to their greater autonomy in terms of fuel supply. On top of that we have the fact that Portugal has reasonable resources of uranium.

Therefore, in order to reduce the implications inherent in coal supply, to avoid running the risk of being dependent on a single energy source in the future, for the production of electric energy, nuclear power plants look highly worthwhile in Portugal in terms of guaranteeing our supply.

There is nothing original in this solution and it is not specific to the Portuguese case; on the contrary, it has been supported and adopted on a worldwide level and it has been recommended by highly responsible international organizations, especially the EEC, which Portugal seeks to join in the near future.

Paria Ferreira: "Nothing is Absolutely Indispensable from the Strictly Technical Viewpoint"

1. From the water power viewpoint, the main harm to come from the construction of nuclear power plants in Spain concerning the rivers flowing through Portugal would basically involve derivatives of any possible thermal or radioactive contamination of the respective water bodies.

The problem, which comes up in terms of downstream water quality guarantees, results from the fact that nuclear power plants require a fast flow rate for system cooling. The temperature rise in the water used in the cooling circuit, in certain types of nuclear power plants, can be something like ten degrees Centigrade.

Another problem is the degree of guarantee against radioactive pollution of cooling waters and nearby water courses.



2. Regarding possible contamination of cooling water from nuclear power plants in Spain and what little we know as to whether or not this contamination would theoretically be possible only due to serious accidents, the fact is that it has been noted that the Portuguese position—to the extent that we cannot prevent the existence of these power plants—should be aimed at proposing that the cooling circuits be closed and be provided with automatic isolation systems in case of contamination accidents.

In the case of the Almaraz Nuclear Power Plant, on the Tejo River, which is now in operation, the cooling system is based on a closed circuit and between the recovery site and the Portuguese border we have the dams of Cedillo, Alcantara, Torrejon, and Valdecanas, with capacities in excess of 3 trillion cubic meters, enough to normalize the water temperature upon entry into Portugal through the Fratel Dam. Regarding radioactive contamination, these dams also constitute an important element in the propagation dilution and control process.

Concerning the possible Sayago Power Plant on the Douro River, given its proximity to the Portuguese border (20 kilometers), the temperature and contamination problem does assume importance. It is certain that the Ricobayo Dam [reservoir] could be studied in terms of making sure that, if the proper dilution flow rate were to be maintained, the temperature rise resulting at the border would not exceed 3 degrees Centigrade which would be an acceptable figure since, downstream from Sayago, we have the Spanish dams at Villalcampo and Castro while in the international upstream section held by Portugal we have the Portuguese dams of Miranda, Bemposta, and Picote; in the Spanish section of course we have the Aldeadavila and Saucelle Dams.

In spite of the existence of this entire water volume, the truth is that the upstream dams in the international section of the Douro are Portuguese and we cannot, along the border, accept a temperature rise of more than 3 degrees Centigrade and the guarantee of dilution offered by the Ricobayo flow rate is far from definite.

We had an opportunity earlier to inform the directorate-general of water projects of Spain that, if it were to be decided to go ahead with the construction of the Sayago Power Plant, Portugal would probably ask that the cooling system for this power plant be designed with a closed circuit, taking as a basic requirement and for the maximum temperature rise, in the area leading to the Miranda Dam Reservoir, a figure of 3 degrees Centigrade.

Concerning the possible power plant along the Guadiana Basin at Villanueva de la Serena, we have no knowledge as to its characteristics.

Somehow—and because between the return from this power plant and the Portuguese border, at the mouth of the Caia, there is no major storage facility—it would not be conceivable for the responsible Spanish agencies not to have thought of a closed cooling system in case the intention to go



ahead with the undertaking were to be confirmed. Somehow—and because the Alqueva storage facility is under construction in Portugal, reaching the border at the mouth of the Caia—it is up to us to be on the alert and in no way whatsoever to accept a water temperature rise of more than 3 degrees Centigrade above normal and habitual temperature.

Regarding radioactive pollution, although there is no technique and no economically viable way to put big storage facilities along the Guadiana River in Spain, downstream from Villanueva de la Serena, the Alqueva Reservoir, with its 4,140 million cubic meters, could constitute a means of dispersion that might possibly be sufficient to dilute the radioactive effects and to permit control over their downstream spread.

Because waters from the Guadiana in Spain are already being used in many different ways, a small dam has already been built just downstream from the confluence with the Caia River, where we are now installing a whole series of apparatuses designed to measure the quantity and to analyze the quality of waters coming into the international section which, as we know, was awarded to Portugal by the 1968 Convention. These measurements include those parameters which characterize any possible radioactive contamination.

Keeping in mind the suitability and necessity of officially determining what really goes on in the neighboring countries regarding the adoption of the decision to build the Villanueva de la Serena Nuclear Power Plant, this directorate-general has already taken the initiative in addressing itself to the directorate-general of water power projects of Spain and the Madrid Hydrographic Studies Center, asking for information on this matter.

Last March a conference took place in Lisbon on the initiative of what was then the secretariat of state for physical plant, water power resources, and environment, chaired by that secretariat of state and by the undersecretary of state of territorial plants and environment of Spain. The Portuguese side was represented by the various directors-general and officers in charge of services more directly involved in and connected with the subject matter taken up while the Spanish side was represented by the director-general of water power projects and the director of the hydrographic research center.

This meeting resulted in the signing of a document which, among other recommendations, called for the implementation of collaboration on studies and the exchange of information concerning water quality in common rivers; exchange of experiences and cooperation in areas of concern to quality and contamination problems. As a result of the signing of this document, we are now in the process of establishing study groups made up of technicians from both countries, responsible for the study of the subject matter involved.

It thus seems that it will be a good idea to establish close contacts between the current secretariat of state for public works and for urban development and environment in terms of persuading the responsible Spanish sectors to go in for the studies that may be considered necessary.

We must not forget that, in the case of the Guadiana, and beyond the use of the waters for all purposes in the Badajoz Plain between Villaneuva de la Serena and that city, the Spaniards will still be using waters from the Guadiana downstream from our utilization points at Alqueva, Rocha da Gale, and Pomarao, in the international section between the mouth of the Chanca and Vila Real de St. Antonio, which however have not been allocated as of now, although this is something to be settled by an agreement to be entered into.

3. From the strictly technical viewpoint in the light of current conditions and in medium-range and long-range terms, nuclear power plants are not indispensable in meeting the anticipated electric energy requirements.

The problem comes up more in economic terms rather than in engineering terms as we realize that--since the cost of producing energy from nuclear sources is relatively low compared to the other alternatives contemplated--the introduction of a nuclear component into the national production system would directly be expressed in a lowering of the average cost of producing each kilowatt-hour and this in turn would give the Portuguese people an opportunity to get cheaper energy.

Frederico Carvalho: "High-Capacity Power Plant Construction Undesirable in Short-Range or Medium-Range Terms"

1. The nuclear power plant now being planned on the Guadiana about 200 kilometers from the Portuguese border, would during the first phase be equipped with a reactor of the BWR type, made by GE, with a liquid [sic] electric capacity of 937,000 kilowatts. During the second phase, it would receive another, identical unit. The power plant would be operated by the Seville Electricity Company and the Spanish Hydroelectric Company, two private outfits which, together with Electrical Union, already have the nuclear power plant at Almaraz, on the Tejo, about 80 kilometers from the border.

In a recent article in the magazine PODER LOCAL (No 13, last May), concerning the Sayago Power Plant, on the Douro--which, we know, has not yet been authorized by the Spanish government--we expected that, following completion of the preliminary study and approval by the Spanish Parliament, the neighboring country's nuclear program would get the license for the construction of the nuclear power plants at Valdecaballeros and Trillo, in the way this happened in the case of the Sayago Power Plant. The recent approval, by the Spanish Parliament, of the new version of the Spanish nuclear program and the authorization for construction given just now will give the go-ahead for the ambitious Spanish electric nuclear plans drawn up

just a few years ago, a plan which we considered unrealistic but which was pushed along by the objective reality of the economic crisis in Spain and, generally speaking, in Europe's capitalist countries.

If a nuclear power plant were to be built and operated under good conditions, with the application of all appropriate technical solutions known today, it would not cause any damage to the neighboring populations—and even less so to the more remote population centers—under normal operation of course. As far as the cooling water supply is concerned—about 40 cubic meters per second—the aspect to keep in mind is not radioactive or other pollution—since the limits fixed for drinking water standards must not be exceeded—but above all the aspects of water heating. The water comes out 10 degrees Centigrade hotter and the water power facilities have to be so designed that the hot water will be mixed, as it comes out, with other water, reducing the temperature rise to 3 or 4 degrees Centigrade just a few kilometers from the power plant.

This is a design problem which must be checked by the proper authorities and it may be necessary to employ closed-circuit (heating towers) or semi-closed circuit cooling, using a lagoon or a dam reservoir. In these cases, the effects of evaporation—which will be relatively localized—must also be analyzed during the planning phase.

In the case of a serious accident, just as it happened at Harrisburg in the United States, the main risk of radioactive pollution comes from the emission of gaseous and dusty radioactive products (or aerosols) which may be transported by the wind and which may cover areas several scores of kilometers away from the power plant.

Accidents, such as the one at Harrisburg, which almost exclusively resulted in economic losses to the power plant itself, however are rather unlikely especially when there is no competition between rival enterprises to get maximum profits.

One can say, in conclusion, that the damage to Portugal resulting from the construction of the nuclear power plant on the Guadiana will be much more imaginary than real, in other words, the real damage to the country resulting from interruption of work at Alqueva, which is so little talked about this time.

2. To minimize the risk of accidents in a nuclear power plant and to guarantee a high degree of safety, it is indispensable to carry out adequate and constant inspections throughout the entire undertaking, from the planning phase all the way to the operational phase. This supervision must be carried out by the authorities through agencies that are technically well equipped and properly staffed with competent technical personnel. It must be guaranteed that the most perfect technical solutions will be used, even though they may raise the investment and operating costs. In particular it is necessary to set up a network of environmental (air and

water) control stations, coupled with an alarm system both of which together will start up the necessary emergency measures planned in advance to safeguard the population centers that may be hit.

In the case of the principal international rivers which flow into Portugal (Tejo, Douro, and Guadiana), water quality control measurements have already been taken regularly in some cases for a number of years (including radioactivity, chemical pollution, and temperature). But much more remains to be done and above all it is necessary, under this heading as well as under others, to work closely with the Spanish authorities.

3. There is no great doubt in the worldwide context that, over the next several decades, the utilization of nuclear energy will continue and will be developed as a source of alternate energy, compared to coal, petroleum, and natural gas, not only in electric energy generation but also in the production of low-temperature heat (for urban heating) and high-temperature heat (for industry). This evolution depends on the start of commercial operations of new-type, plutonium-producing reactors which make better use of natural uranium (at the rate of 50:1, compared to the current nuclear power plants). Thus it will be possible to save petroleum for petrochemistry and greatly to reduce pollution in industrial and urban areas (now charged with sulfurous gases and toxic nitric acids), as well as the disastrous ecological effects deriving from the intensive extraction of coal in the big strip mines.

Under current conditions in Portugal, the construction of a high-capacity nuclear power plant is undesirable in short-range or medium-range terms for economic and financial reasons as well as in terms of technical and industrial preparation and national independence. The alternative necessarily is coal and petroleum and—why not?—natural gas for the generation of electric energy, for industry, and for transportation. There is every indication that water power resources will not be sufficient to produce the kind of electric energy which Portugal will need within less than ten years; besides, the electric power generating system must, for technical reasons, be diversified due to the instability of the water flow volume.

On the other hand, solar energy—which is certainly an energy source of the future—is not yet in fact an energy today and, considering the current state of the art, could not at this time during the next decade supply more than a very tiny fraction of Portugal's energy needs. We must however without hesitation invest in its study and application where and when possible, especially regarding the production of hot water.

Nuclear energy, not to speak of the many other peaceful applications of the atom, must be developed in Portugal with a view to its future utilization which, if it is to be handled safely and usefully, requires us to develop a high scientific and technical level through our own experience.



Portugal is a fuel-importing country and we therefore will probably have to resign ourselves to continue as such for a long time and we will have to balance our needs through an increase in output and exports, combined with favorable barter trade agreements involving goods and services and, although on a small scale, the intelligent promotion of really effective energy savings and conservation methods.

Almeida Fernandes: "We Do Not Always Remember Hiroshima"

1. Asking what kind of harm could come to Portugal from the construction of a nuclear power plant, to be situated on the Guadiana, is to confine the problem to a special case which is now most in evidence. The more generic question boils down to the existence of nuclear power plants on rivers that flow through Portugal or, more specifically, the problem of the right which a nation can claim to pollute or to be able to pollute international water bodies possibly damaging other nations. If I were to be asked this question, I would reply very simply: There is no such right (in moral or legal terms) but the fact is that this is happening a little bit everywhere all over the world.

Of course, the fact that it happens does not remove the blame from anybody; it only means that the international community, in this and other cases, has not yet learned to coexist.

In Europe, the OECD, the Council of Europe, and the EEC itself are trying to spell out the "rules of the game" and to negotiate basic agreements or declarations; but this is almost always in vain or it does not go beyond the level of "recommendations to the interested parties." The situation is very simple: We have no legally binding instrument on questions of pollution going across international borders. The countries of the EEC are those that are perhaps closest to an agreement that would bind all parties involved.

But let us get to the question that was asked! Talking about the Guadiana in connection with Valdecaballeros, located more than 150 kilometers from the Portuguese border, is to forget the very specific fact that we already have a power plant operating on the Tejo, much closer to us, at Almaraz, north of Cáceres, and we might then have another one just about 10 kilometers away, on the Douro, at Sayago.

The problem is much bigger than that and the Guadiana Power Plant (we are of course about to forget here the other power plant authorized on that same date, at Trillo, likewise on the Tejo, situated northeast of Guadalajara) is not as close to us so that it might immediately cause problems for us at Alqueva, as has been maintained. The problem is much bigger than that and comes up in terms of nuclear options. The question is this: Can an independent country select nuclear energy as a medium-range and long-range option, can it draw up a national energy program based on it, without satisfying its neighbors, particularly those



who are downstream from the water courses used to cool the water for the power plant? This seems to me to be the real crux of the problem—establishing compatibility between national independence and a policy of non-interference and the rights of nations not to be attacked by virtue of actions and decisions taken in pursuit of that independence.

This is a problem of moral and international law which is far from resolved.

This is why I am not responding in terms of possible thermal and radioactive pollution of the Guadiana River, in terms of a possible nuclear disaster, but in much broader terms, that is, mutual respect between the nations of the international community and the limits of national independence.

The chemical, bacteriological, and radiological warfare which even today is part of our daily life, conducted with weapons as sophisticated as smokestacks, sewers, cooling circuits, washing water, gaseous emissions, solid waste, etc.—that war is much more serious than the possible power plant on the Guadiana because it is already a reality, because it attacks us all in an insidious and silent fashion.

The thing that is at stake here, basically, is our technological civilization which, to built itself up, disdained a fundamental component of the "quality of life"—the possibility that such a quality is possible!

2. We all know that opinions are divided on this matter and talking in terms of hazards and inconveniences, for getting that there can be benefits and conveniences, is to reason aprioristically, without any real scientific spirit, as is normally done when this problem is tackled.

I will not present to you here a cost-benefit analysis of a nuclear power plant or even a nuclear option. I would not be able to do that and I think that nobody could honestly do that. But a cost-benefit analysis in economic terms would not be enough; we would also need sociological, cultural, and psychological data, plus the possible environmental impact, whose qualitative and quantitative expressions are simply beyond our means right now.

In your question you touched on the hazards deriving from nuclear power plants which assumes that the biggest fear comes from their existence. Well, the fact is that, as far as safety features in power plants is concerned, current technology has responded to that problem with great efficiency (not complete efficiency, of course, since there is still a risk). But the situation is not as brilliant when you look at the uranium mineral treatment stations, the enrichment and solid waste transportation facilities and the storage facilities. Here there is much more reason for alarm and the Spaniards have already installed and authorized the expansion of a uranium mineral enrichment plant near Ciudad Rodrigo

and they are going to build another one for uranium oxides at Jurbago (Salamanca).

Finally, I would like to add this:

- (1) The nuclear power plants are installations whose technology is highly sophisticated and safety rules are most conscientiously followed there.
- (2) A serious accident in nuclear power plants is statistically quite unlikely.
- (3) If the improbable were to happen (as it already did), we need a mobilization of human, financial, technical, and scientific resources which only the highly developed countries are capable of mustering.
- (4) Will our neighbor Spain have this capability for mobilization and will this permit the population density of the Iberian Peninsula to accomplish rapid evacuation movements in order to minimize the effects of any accident?

Look at these four premises and draw your own conclusions.

3. This question allows me to ask another one: In what context do the nuclear power plants appear?

The entire international energy policy, so far almost exclusively based on petroleum, had the ultimate purpose of achieving economic growth through enormous consumption of resources. The energy balance of the developed societies is highly wasteful which is why the nuclear option is a consequence of a philosophy and a system based on the production of more and more energy for ever greater consumption (which is considered synonymous with prosperity).

The growth index (in terms of economic growth) can be measured (or has been capable of measurement) in terms of calories produced and consumed which is why the developing countries would like rapidly to increase their energy output so that they may close the gap that separates them from the developed countries. This is what justifies the nuclear option—concentrated and high-content energy.

What is the alternative? Well, there is talk about a "new international economic order" which nobody as yet knows what it is actually supposed to be like! There is talk about qualitative changes in the goals of our society but nobody has a precise idea what that means.

In the case of Portugal, my opinion can be summarized in some simple basic questions:

What kind of society do we want to be?

What economic growth model do we want to adopt?

What are the major medium-range and long-range options?

When we collectively arrive at the answer to these questions, we will know what our real energy needs will be and then we will have to seek the means of satisfying those needs. Up to that point, everything is pure guesswork or, what is even worse, it would mean dependence on foreign supply sources and that would make situations which can decisively influence our answers to these questions irreversible.

The nuclear option is a highly centralizing thing. If it is decided that we must opt for energy centralism, then we run the risk of an almost fatal political centralism which will constitute a heavy burden on the future of our as yet weak democracy. If we should decide that Portugal's future lies in effective decentralization, then the nuclear option seems more difficult to me. However, there is one thing I am sure of and that is that any decision that disregards the effective participation of the population in the preparatory process is not a democratic decision and this is all the more serious, the greater the weight it may have in the future.

In conclusion, let me express a kind of wish: In the discussion of the nuclear problem, let us always adopt an unemotional attitude; let us not always keep thinking of Hiroshima; let us not allow ourselves to be stopped by alien interests and above all let us seek to inform ourselves correctly in order to form our own opinion with the scientific humility of a true humanist.

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